

Institute Activities

Production—the Engineers' Defense Job

A Message From President Sorensen

THE PRESIDENT of the United States, according to the daily press, has declared there is need for still greater acceleration in the manufacture of machines and other defense requirements and that it may become necessary if that need is to be satisfied to withdraw from military service some of the engineers and others with specialized skills now engaged therein and assign them to work in factories making defense equipment.

President James Bryant Conant of Harvard University and others, who have recently been in England as special delegates from the United States, and have witnessed the actual conditions under which the English are waging their battle for democratic freedom, have observed the heart-breaking shortage of engineers, and have come to a full realization of the fact that mechanized war demands a very large number of engineers and skilled technicians for the design and manufacture of mechanical devices and the munitions used by them. The use of men with mechanical and engineering ability for any work other than the making of machinery seems at this time to be very unwise and even unpatriotic.

This issue of *ELECTRICAL ENGINEERING* contains an address, "Priorities in Men" by Doctor Harvey N. Davis, president of Stevens Institute of Technology, which was delivered May 2 at the AIEE Northeastern District Meeting in Rochester, N. Y. President Davis' address should be given careful study by manufacturing companies, selective service boards, college faculties, and all engineers.

As president of the AIEE I have been asked to comment regarding engineers and selective service. I am much interested in accepting the invitation, because I am wholeheartedly of the opinion that every engineer in training (which includes men in college and known to be ready for graduation at a certain time) or engaged in engineering service can for the time being best contribute to the production of defense paraphernalia for his country by continuing his established engineering program. Furthermore, I am of the opinion that the American Council on Education and those persons in Washington who are in charge of the national selective service system are in agreement with the thought that for the present "selective service" means that every engineer engaged in production engineering of any sort, as well as those in training for that production, should be kept at their work until conditions now prevailing have been changed by production having attained a pace which will, with safety to our defense program, permit the release of engineers from production jobs

to what may be called operation occupations, one of which is military service as commonly understood.

Such a procedure does not indicate on the part of engineers any desire to avoid military service when that service is needed. Indeed the program of keeping engineers on production logically may be the best program for preparing these same men to render, when the time comes, the most effective kind of military service inherent in a mechanized military program. This is possible because men who have designed and made machines have a knowledge of how those machines should be operated that cannot be attained by any other experience.

The deferment of military service for engineers and their use at the vital defense business of manufacturing until the manufacturing program has reached a desired speed can be carried out without any change in the present selective service laws and without any onus being attached to the activities of engineers and technical men whose time for military service is deferred until the manufacturing bottleneck has been eliminated. The two essential features in such a program are the development of an understanding among our citizens of the critical need for engineers and technicians, and a complete mutual understanding and unanimous co-operation among selective service boards, manufacturing establishments, colleges, and the individuals involved.

Every factory today should be supporting the defense program by being engaged in making goods directly or indirectly applicable to the defense program. Those industries making goods directly applicable to the program should keep on the job every day every possible man whose leaving the job slows down or curtails the production of needed equipment for even as little as a few hours, because time is the essence of the program and every hour lost is gone forever and may prove very costly. Every engineer and skilled craftsman should be at one of these jobs. If he is not engaged in doing such a job, he should change his occupation to a defense productive job as soon as possible.

Every man who contemplates such a change, which includes every senior student, junior student, and graduate student in an engineering college who has a satisfactory record of achievement in his work and who will graduate as scheduled with his class, should be held to his program of preparation until it has been completed and should be allowed a reasonable time after graduation to obtain employment at some occupation where his training will be applicable to the defense program.

Every industry making defense equip-

ment, therefore, whenever the enlistment for military service of one of their men doing good work in manufacturing comes up for consideration, should present to the selective service boards all the facts pertaining to the usefulness of the man in the manufacturing program.

Likewise, every engineering college, when a teacher or student is called by the selective service board, should supply the local selective service board with complete information regarding the man's status as teacher or student and argue fully as to his effectiveness and the need of his particular service in the program of training engineers and technical men.

In conjunction with the information presented by the industry or engineering college every individual engaged in defense production should, when called to report, file with his selective service board complete and accurate data regarding his work, including the time required to have a successor ready to carry on his work.

All this procedure is necessary and should not be considered as an attempt to avoid military service in any way. Quite the contrary, for in our mechanized military program of today such procedure is just a way of determining how every man may be kept where he can be of greatest service to the defense program. This idea naturally is not one readily conceived by many persons, because in all wars preceding the present one, battle strength has been determined to a much greater degree by the mere number of fighting soldiers available and the completeness of their training for marching and for hand-to-hand combat. In the present war the effectiveness of fighting forces is determined not by the gross number of men, but by the number and quality of machines available and the skill of a comparatively few men highly trained in the knowledge of how these machines are made and effectively operated. As has been said in this war the job at the traditional battle front seems to be for the few and the vital production job behind the line for the many. While this condition exists, we cannot afford to have any more men doing what some engineers in service are now doing: work routine such as issuing equipment to recruits.

In conclusion, therefore, while the need is for manufacture rather than for fighters, may I urge that industry, selective service boards, engineering-college faculties, and engineers in practice or in training, all co-operate to make production reach the desired goal, until such time as the need for technical ability in fighting forces begins to catch up with the demand for manufacturing ability. At which time, I am sure, every engineer will be more than willing to change from the job of manufacturing mechanisms of war to the job of operating these devices, and this they will do with a skill that would not be theirs had they not had the experience that is acquired in the factory.

1941 Summer Convention Program Completed

ALL arrangements have been completed for the AIEE summer convention to be held in Toronto, Canada, June 16-20, 1941, with headquarters in the Royal York Hotel. The business features of the convention will consist of ten technical sessions, five technical conferences, and one general session, in addition to the annual meeting, two sections of the conference of officers, delegates, and members, and the Branch counselors' conference. The summer convention committee, under the chairmanship of M. J. McHenry, has arranged an excellent series of social and recreational features beginning with an English tea party at 4:15 p.m. on Sunday, June 15. An account of these features, together with a schedule of events, was given in the May issue, pages 226-9. An additional inspection trip to view the highway lighting on the Queen Elizabeth Way has been added to the list already given.

H. COONLEY TO ADDRESS GENERAL SESSION

For this meeting of the AIEE in Canada, the program committee has selected as the theme of the general session the broad and all-important topic of co-operative effort in the support and further development of our system of free enterprise. This topic will be ably presented by Howard Coonley, chairman of the board of the Walworth Company and chairman of the advisory committee of the American Standards Association. AIEE members have occasion to remember well the stirring address "Total Security—a Challenge" delivered at the recent AIEE winter convention in Philadelphia and published in the March issue of *ELECTRICAL ENGINEERING*. Mr. Coonley's message at Toronto is expected to stress further the importance of every intelligent individual giving serious consideration to these vital topics of the day, and undoubtedly Mr. Coonley will inspire engineers to a more active and effective participation in, and will give many practical suggestions toward, the solution of the more significant problems facing democracy.

ROUTES TO TORONTO

For the summer convention, "all roads lead to Toronto," with excellent facilities for air, rail, or water travel, and excellent highways for automobile travel. From essentially all directions, travel to Toronto is easy. In most instances economical summer round-trip rates will be in force.

For those traveling from or through New York City or New England a special round-trip combination of steamer and train service is offered through the collaboration of the New York Central Railroad and the Canada Steamship Lines. The cost of this combined trip to Toronto, Montreal, and return, including Pullman accommodations on the train and meals and berth on the steamer, is quoted as \$45.15 from New York City; \$41.80 from Schenectady; and \$49.30 from Boston. Canada Steamship Lines' steamers leave Toronto at 3 p.m. eastern standard time on Mondays, Wednesdays, and Saturdays for the trip across the length of Lake Ontario and through the Thousand Islands and the rapids of the St. Lawrence River, arriving at Montreal at 6:30 a.m.

Attention is called to the famous Saguenay River trip from Montreal, of three nights and two days duration. The all-expense cost, including meals and berth, is \$38.00. Stopovers may be made at any point en route, such as Murray Bay or Tadoussac, or at Quebec.

The all-rail direct round trip from New York City to Toronto is quoted at \$35.90 including Pullman lower berth but no meals. Trains providing through facilities leave New York at 9 a.m., 8:15 p.m., and 11:35 p.m., arriving at Toronto respectively at 8:20 p.m., 8 a.m., and 11:30 a.m.

Further information may be secured from J. P. Sweeney, New York Central Railroad, 466 Lexington Avenue, New York, N. Y.; or from J. J. Daly, Canada Steamship Lines, 535 Fifth Avenue, New York, N. Y.

ADVANCE REGISTRATION

Members who have received an advance registration card should fill in and return the card promptly, if they have not already done so. Hotel reservations should be made by writing directly to the Royal York Hotel, Toronto, Canada, or any other hotel preferred. For convenience, the rates of the Royal York and several other hotels were given in the May issue, page 229. The rate for a double room for two persons at the Royal York, incorrectly stated there as \$6.00, is \$7.00. For technical program see pages 282-3.

Howard Coonley to Address Summer Convention

Taking as his theme the need for strong and co-operative effort to insure the survival of the free-enterprise system and the democratic way of life, Howard Coonley, chairman of the board of the Walworth Company, New York, N. Y., will be the featured speaker at the general session, Thursday morning, June 19, of the AIEE 1941 summer convention at Toronto, Can.

Mr. Coonley is chairman of the advisory committee of the American Standards Association, a past president of that or-



HOWARD COONLEY

ganization, and past present, past chairman of the board, and currently chairman of the executive committee of the National Association of Manufacturers. A native (1876) of Chicago, Ill., he received his first business experience from 1900 to 1902 with the Chicago office of the Waltef G. Baker Company. In 1902 he and his three brothers organized the Coonley Manufacturing Company, Cicero, Ill., to make enamel cooking utensils, of which he was vice-president 1902-08, and president 1908-30. He was also associated with his brothers in a pioneering enterprise in Texas in the early 1900s, which included development of cattle raising and farming and ultimately building several towns and a 40-mile railroad on a 100,000-acre tract.

In 1913 he became president of the Walworth Company, maker of valves, pipe fittings, and tools, and in 1936 became chairman of the board. For many years he has taken an active interest in improving the company's industrial relations and in promoting the safety, health, and welfare of its employees. He is a member of the American Society of Mechanical Engineers and of the Academy of Arts and Sciences.

Speakers Stress National Defense at North Eastern District Meeting

CONTINUING its traditional practice of giving prominent attention to the non-technical as well as the technical phases of engineering enterprise, the AIEE North Eastern District featured a generous number of speakers on topics of general interest and importance during its recent Rochester meeting. The all-important all-pervading subject of national defense, in various aspects, furnished pretty much of a common theme for the various addresses.

The list of prominent speakers included Doctor Harvey N. Davis, president of Stevens Institute of Technology; Doctor Alan Valentine, president of the University of Rochester; Doctor R. H. Manson, vice-

president and general manager, Stromberg-Carlson Telephone Manufacturing Company; Herman Russell, president, Rochester Gas and Electric Corporation; Doctor R. W. Sorensen, president AIEE; Everett S. Lee, vice-president AIEE, North Eastern District; and National Secretary H. H. Henline.

"Priorities in Men" was the topic to which Doctor Davis spoke in emphasizing what he termed as a defense necessity and patriotic duty of all parties concerned of conserving and allocating technically trained man power just as carefully and as intelligently as strategic inanimate materials are allocated under the priorities system. The

full text of Doctor Davis' address appears elsewhere in this issue. Doctor Sorensen, in remarks made upon various occasions, touched upon this as well as other matters of interest and significance to the Institute. In general, Doctor Sorensen's remarks are embraced by a written contribution which appears elsewhere in this issue, the third in a series of recent "Messages From the President" in which he has discussed topics relating to national defense.

In discussing "The Engineering Societies and National Defense," Mr. Henline briefly reviewed the scope and nature of the AIEE and of the national societies of civil, mining, and mechanical engineers, indicating some of the differences in principal interests and objectives. Touching upon co-operative activities, Mr. Henline mentioned briefly the national census of engineering firms, the national roster of engineering and scientific personnel, the selection of co-ordinators for the Defense Contracts Service, the study of supply and demand of engineers, and the National Technological Civil Protection Committee. He pointed out that in addition to collaborating on matters of direct common interest such as the foregoing, each of the four societies are carrying on other activities best suited to the membership of the individual organi-

Analysis of Registration at Rochester

Classification	Rochester Section	Dis-trict 1*	Other Dis-tricts	Totals
Members.....	57.....	75.....	25.....	157
Enrolled				
Students.....	0.....	113.....	4.....	117
Men guests.....	27.....	25.....	8.....	60
Women guests.....	11.....	8.....	2.....	21
Totals.....	95.....	221.....	39.....	355

*Outside Rochester

North Eastern District Meeting Attendance 1931-1941

Date	Location	Attendance
1941—Apr. 30—May 2..	Rochester, N. Y.....	355
1939—May 3-5.....	Springfield, Mass.....	439
1938—May 18-20.....	Lenox, Mass.....	439
1937—May 5-7.....	Buffalo, N. Y.....	371
1936—May 6-8.....	New Haven, Conn.....	338
1934—May 16-18.....	Worcester, Mass.....	337
1933—May 10-12.....	Schenectady, N. Y.....	451
1932—May 4-7.....	Providence, R. I.....	252
1931—Apr. 29—May 2..	Rochester, N. Y.....	370

zations, with appropriate collaboration, but naturally not all of the four doing the same thing. He reviewed typical AIEE efforts to co-operate in the matter of national defense, including the resolution adopted by the board of directors last June offering the services and facilities of the Institute to the Government, the series of six radio programs broadcast toward the end of this last winter, the decision to form an AIEE committee on national defense, the important local work undertaken by many Sections, and the many important technological contributions stimulated and facilitated through the work of the Institute's various committees.

Monday, June 16

9:00 a.m. Registration

9:30 a.m. Instruments and Measurements

41-106. EFFECT OF SAPPHIRE CRYSTAL ORIENTATION ON THE WEAR OF WATTHOUR METER BEARINGS. J. H. Goss, General Electric Company

41-108. AN IMPROVED FREQUENCY METER FOR COMMERCIAL POWER FREQUENCIES. K. J. Knudsen, Hickok Electrical Instrument Company

41-119. POWER CIRCUIT INSTRUMENTS FOR THE HIGHER RANGE OF AUDIO-FREQUENCIES. L. J. Lunas and Paul MacGahan, Westinghouse Electric and Manufacturing Company

41-125. RELATIVE ACCURACY OF THREE-PHASE METERING COMBINATIONS. C. T. Weller, General Electric Company

41-112. THE SHIELDING OF PERMANENT MAGNETS FROM TRANSIENT MAGNETIC FIELDS. G. J. Wey, Westinghouse Electric and Manufacturing Company

9:30 a.m. Communication

41-113. RADIO BROADCASTING IN CANADA. Augustin Frigon, Canadian Broadcasting Corporation

41-129. THE MEASUREMENT OF BODY CURRENTS. R. S. Schwab, Massachusetts General Hospital

41-130-ACO.* SOUND RECORDING FOR THE AMATEUR. A. L. Williams, The Brush Development Company

41-111-ACO.* PHONOGRAPH RECORD RECORDING AND REPRODUCING. A. D. Burt, RCA Manufacturing Company, Inc.

Wednesday, June 18

9:30 a.m. Basic Sciences and Electronics

41-103. A SHORT METHOD FOR EVALUATING DETERMINANTS AND SOLVING SYSTEMS OF LINEAR EQUATIONS WITH REAL OR COMPLEX COEFFICIENTS. P. D. Crout, Massachusetts Institute of Technology

41-105. DIODE RECTIFYING CIRCUITS WITH CAPACITANCE FILTERS. D. L. Waidelich, University of Missouri

41-96. MEASUREMENT OF PRE-BREAKDOWN CURRENTS IN DIELECTRICS WITH A CATHODE-RAY TUBE. H. H. Race, General Electric Company

41-107. ANALYTICAL METHODS OF SOLVING DISCRETE NONLINEAR PROBLEMS IN ELECTRICAL ENGINEERING. E. G. Keller, Lockheed Aircraft Corporation

41-117. CURRENT RATING WITH LIFE OF COLD-CATHODE TUBES. G. H. Rockwood, Bell Telephone Laboratories, Inc. ,

9:30 a.m. Insulation Testing

41-131. IMPULSE STRENGTH AS A MEASURE OF CABLE QUALITY. L. I. Komives, The Detroit Edison Company

41-118. THE BASIS FOR THE NONDESTRUCTIVE TESTING OF INSULATION. R. F. Field, General Radio Company

41-132. THE A-C DIELECTRIC-LOSS AND POWER-FACTOR METHOD FOR FIELD INVESTIGATION OF ELECTRICAL INSULATION. F. C. Doble, Doble Engineering Company

41-120. BUSHING TESTS. A. L. Brownlee and W. H. Wickham, Commonwealth Edison Company

41-133. THE PROTECTION OF SOLID INSULATION

Vice-President Lee spoke upon several occasions, introducing many a thought of inspiration and challenge. In his address of welcome, Mr. Lee emphasized the multiple capacity in which AIEE members were present for the Rochester meeting: as rep-

Summer Convention

(Eastern Daylight

● PAMPHLET reproductions of authors' manuscripts of the numbered papers listed in this program may be obtained on noted in the following paragraphs.

● ABSTRACTS of papers appear on pages 290-3 of this issue and pages 230-1 of the May 1941 issue of Electrical Engineering.

● PRICES and instructions for securing advance copies of these papers accom-

pany LIGHTNING ARRESTERS. D. D. MacCarthy and T. J. Carpenter, General Electric Company

9:30 a.m. Switching Equipment

41-114. MECHANICAL SIMPLICITY OF AIR-BLAST CIRCUIT BREAKERS. H. W. Haberl, Montreal Light, Heat, and Power, Consolidated, and Otto Jensen, I-T-E Circuit Breaker Company

41-121. SYSTEM SHORT-CIRCUIT CURRENTS. W. M. Hanna, Consolidated Gas, Electric Light, and Power Company, H. A. Travers and C. F. Wagner, Westinghouse Electric and Manufacturing Company, and C. A. Woodrow and W. F. Skeats, General Electric Company

41-116. POWER CIRCUIT BREAKER RATINGS. R. C. Van Sickle, Westinghouse Electric and Manufacturing Company

41-128. PROTECTION OF LOW-VOLTAGE CIRCUITS BY AIR CIRCUIT BREAKERS IN CASCADE ARRANGEMENT. A. E. Anderson and C. H. Black, General Electric Company

41-134. DIELECTRIC STRENGTH OF OIL FOR HIGH-POTENTIAL TESTING OF OIL CIRCUIT BREAKERS. H. J. Lingal, Westinghouse Electric and Manufacturing Company, W. F. Skeats, General Electric Company, and H. D. Braley, Consolidated Edison Company of New York, Inc.

2:00 p.m. Electrical Machinery

41-84. METHODS OF DETERMINING NATURAL FREQUENCIES IN COILS AND WINDINGS. L. V. Bewley, Lehigh University, and J. H. Hagenguth and F. R. Jackson, Jr., General Electric Company

41-110. DAMPING AND SYNCHRONIZING TORQUE OF THE DOUBLE-FED ASYNCHRONOUS MACHINE. M. M. Lisschitz, Westinghouse Electric and Manufacturing Company

41-126. TRANSIENT TORQUES IN SQUIRREL-CAGE INDUCTION MOTORS, WITH SPECIAL REFERENCE TO PLUGGING. E. S. Gilfillan, Jr., and Edward Kaplan, Westinghouse Electric and Manufacturing Company

41-127. EXCITATION CIRCUITS FOR IGNITRON RECTIFIERS. H. C. Myers and J. H. Cox, Westinghouse Electric and Manufacturing Company

41-124. A NEW TRANSFORMER FOR BASE LOAD STATIONS. Philip Sporn, American Gas and Electric Service Corporation, and H. V. Putman, Westinghouse Electric and Manufacturing Company

2:00 p.m. Relays and Bus Protection

41-99. BUS PROTECTION INDEPENDENT OF CURRENT TRANSFORMER CHARACTERISTICS. G. Steeb, Buffalo, Niagara, and Eastern Power Corporation

41-135. NEW CURRENT TRANSFORMERS FOR BUS DIFFERENTIAL PROTECTION. L. F. Kennedy and A. T. Sinks, General Electric Company

representatives of the 2,300 members of the North Eastern District with its 12 Sections and 18 Student Branches; as representatives of the AIEE's world membership of some 18,000; as representatives of "a million or more" engineers and scientists;

Technical Program

Saving Time)

pany the abstracts. Mail orders are advisable, particularly from out-of-town members, as an adequate supply of each paper at the convention cannot be assured. Only numbered papers are available in pamphlet form.

● ALL PAPERS regularly approved by the technical program committee ultimately will be published in Transactions; many will appear also in Electrical Engineering.

41-109. A SIMPLE METHOD FOR DETERMINATION OF RATIO ERROR AND PHASE ANGLE IN CURRENT TRANSFORMERS. E. C. Wentz, Westinghouse Electric and Manufacturing Company

41-122. D-C MACHINE FLASHOVER AND BUS SHORT-CIRCUIT PROTECTION. T. B. Montgomery and J. F. Sellers, Allis-Chalmers Manufacturing Company

41-102. DEVELOPMENT IN LIGHTNING PROTECTION OF STATIONS. E. R. Whitehead, Duquesne Light Company

2:00 p.m. Conference on Industrial High-Frequency Heating by Means of Electronic Tubes

Heating by means of high-frequency currents has been an industrial process for a number of years. Alternating-current generators or some form of spark gap with an oscillating circuit have been used as converting devices. More recently two factors have served to make the use of electron tubes a more promising method than heretofore: first, the use of very high frequencies (megacycles) to give heating of material between capacitor plates due to dielectric losses; and second, a combination of higher power requirements than obtainable from a spark-gap type of converter in combination with a higher frequency than is practical from an alternator. It is hoped that those interested in the use of high-frequency heating, as well as those interested in the design of the equipment, will attend this conference.

Discussion leader: W. C. White, General Electric Company.

Thursday, June 19

10:00 a.m. General Session

President R. W. Sorensen, presiding
Address, "Co-operative Effort in Support of Our System of Free Enterprise." Howard Coonley, chairman of the board, Walworth Company, Inc.

2:00 p.m. Power Transmission

41-95. THE 220,000-VOLT SYSTEM OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO—II. A. H. Frampton and E. M. Wood, Hydro-Electric Power Commission of Ontario

41-94. CONDUCTOR VIBRATION—THE THEORY OF TORSIONAL DAMPERS. J. W. Speight, Hydro-Electric Power Commission of Ontario

41-97. MEASUREMENT AND CONTROL OF CONDUCTOR VIBRATION. G. B. Tebo, The Hydro-Electric Power Commission of Ontario

41-115. LIGHTNING TO THE EMPIRE STATE BUILDING—II. K. B. McEachron, General Electric Company

as citizens with responsibilities paralleling their technical and professional enterprises and at least equally important.

Doctor Valentine, in a challenging address delivered before the entire assemblage at the banquet, urged engineers to en-

deavor to "help the people of the country to make the difficult discrimination between facts and opinions in the dangerous and difficult circumstances which so seriously threaten our security as a nation and our liberty as individuals." Doctor Valentine

2:00 p.m. Industrial Power Applications

41-123. THE INCANDESCENT LAMP SITUATION FROM THE ENGINEERING POINT OF VIEW. P. S. Millar, Electrical Testing Laboratories

41-136. A DISTRIBUTION SYSTEM FOR WARTIME PLANT EXPANSION. J. L. McKeever, Canadian General Electric Company, Ltd.

41-98. A NEW MERCURY RHEOSTATIC ELEMENT FOR REGULATION AND CONTROL. K. A. Oplinger, Westinghouse Electric and Manufacturing Company

2:00 p.m. Conference on Education

Friday, June 20

9:30 a.m. Land Transportation

41-101. ELECTRIC LOCOMOTIVE APPLICATION. E. W. Brandenstein** and D. R. MacLeod, General Electric Company

41-100. GLASS BULB MERCURY-ARC RECTIFIERS FOR TRACTION SERVICE. C. E. Woolgar, Northern Electric Company

41-104. MODERN MOTORS SERVE CITY TRANSIT SYSTEMS. W. J. Clardy and C. A. Atwell, Westinghouse Electric and Manufacturing Company

9:30 a.m. Conference on Power Generation

This conference will continue the work of the January meeting on load swings, governing, system stability, and service continuity.

CP.† A TURBINE GOVERNOR PERFORMANCE ANALYZER. W. O. Osbon, Westinghouse Electric and Manufacturing Company

CP.† SYNTHETIC OR EQUIVALENT LOAD-CURVES. R. F. Hamilton, Consulting Engineer

9:30 a.m. Conference on Protective Lighting

This conference will consider the protective lighting of factories against sabotage and espionage. The equipment for use, the distribution systems, and various sundry types of protective lighting will be discussed as well as black-out lighting as practiced in countries now at war from the point of view of possible future application.

2:00 p.m. Conference on Domestic and Commercial Applications

Brief summaries of work on the following topics in this field will be presented: motor-actuated appliances, heat-actuated appliances, interior wiring, and service requirements for industrial and commercial applications.

CP.† CONTROLLING DOMESTIC WASHING MACHINES AUTOMATICALLY. W. J. Russell, Westinghouse Electric and Manufacturing Company

CP.† DOMESTIC OIL BURNER CONTROLS. W. H. DeLancey, Gilbert and Barker Manufacturing Company

*ACO: Advance copies only available; not intended for publication in TRANSACTIONS.

†CP: Conference paper; no advance copies are available; not intended for publication in TRANSACTIONS.

**Deceased May 20, 1941.

emphasized that a thoughtful and educated people, especially in an emergency such as the present, should discourage passion and name-calling; should encourage tolerance, especially with reference to minor or technical differences; should carefully distinguish between facts and opinions; should ever be on the alert to guard and preserve the Bill of Rights; should now "before the heat of battle" thoughtfully consider the kind of peace to be sought for and the desirable objectives and terms to be associated with it toward a constructive and durable result—citing a rapid and preconsidered peace is necessary if the hatreds and conflicting interests are not to be fanned anew by over-long negotiations.

Doctor Manson, in a necessarily limited way, indicated something of the significant contributions being made to national defense by the communications industry.

ATTENDANCE

The meeting of the North Eastern District in Rochester, N. Y., April 30-May 2, was the 15th such meeting to be held by the District and the second to be held in Rochester. The accompanying tables present an analysis of the attendance of this year's meeting and a comparison with recent part years.

STUDENT ACTIVITIES

Continuing the tradition of the North Eastern District, student activities were given a prominent place on the meeting program, including two student technical sessions and joint participation in many of the general activities and inspection trips. Of the 18 Student Branches in the North Eastern District, all but one were represented, many by relatively large groups. It was reported that in terms of round-trip traveled distances, the students present at Rochester represented about 80,000 man-miles of travel.

At a brief business session held immediately following a general luncheon, Professor Eric A. Walker, chairman of the North Eastern District committee on student activities was appointed to serve as the District's official counselor-delegate to the annual conference of officers, delegates, and members to be held as a part of the program for the forthcoming summer convention at Toronto.

The student technical sessions were arranged as follows:

Graduate Session

Peter Jaremko presiding.

THE BEAM POWER OSCILLATOR. H. L. Kraus, Yale University.

A HIGHLY SENSITIVE D-C AMPLIFIER USING A-C POWER EXCLUSIVELY. S. E. Miller, Massachusetts Institute of Technology.

TRANSIENTS IN SMALL SYNCHRONOUS MACHINES. Frank S. White Jr., Harvard University.

IMPEDANCE MATCHING OF DIRECTIONAL ANTENNA ARRAYS. C. W. Thulin, Worcester Polytechnic Institute.

A NEW TRANSMITTING ANTENNA FOR HIGH-DEFINITION TELEVISION. Burton P. Brown Jr., University of Vermont.

Undergraduate Communications Session

H. L. Kraus presiding.

A HIGH IMPEDANCE VOLTAGE INDICATOR. Leon E. Coff Jr., and James F. Hasney, Rhode Island State College.

THE IONOSPHERE AND ITS EFFECT ON RADIO WAVES. S. K. Brown, Cornell University.

DEVELOPMENT OF AN ACOUSTICAL RESISTANCE.

A. S. Chodakowski and F. W. Ziegler, Worcester Polytechnic Institute.

AN ELECTRONIC HALF-CYCLE COUNTER. B. E. Hand, Massachusetts Institute of Technology.

DEVELOPMENT OF A HIGH-SPEED WATT-SECOND RECORDER FOR MEASUREMENT OF TRANSIENT ENERGIES. J. H. Arthur, Rensselaer Polytechnic Institute.

UNIVERSAL-FREQUENCY SWEEP CIRCUIT. W. A. Knoop, Jr., Rensselaer Polytechnic Institute.

Undergraduate Power Session

J. Coolidge presiding

SOME PROBLEMS IN SECONDARY GROUNDING. Arthur Eckels, University of Connecticut.

ECONOMICS OF CABLE TESTING. Stephen J. O'Neil, Northeastern University.

EFFECT OF THE SHAPE OF ELECTRODES ON THE BREAKDOWN VOLTAGE OF A STANDARD INSULATON. Clayton H. Preble, University of Maine.

ARTIFICIAL LOADING OF INDUCTION MACHINES BY UNBALANCED VOLTAGES. R. A. Muir and G. T. Douglass, Worcester Polytechnic Institute.

CHANGES IN DIELECTRIC CONSTANT OF ALKALI-HALIDE CRYSTALS UNDER THE INFLUENCE OF IRRADIATION. Milton Sanders, Massachusetts Institute of Technology.

Doctor Scott Challenges Students. Doctor Charles F. Scott, past president of the Institute and a founder of AIEE Student Branch activities, and long a regular attendant at these gatherings, found himself unable to attend and sent the following challenging message to be read at the student luncheon:

"To the AIEE Student Convention at Rochester:

"As your District member of the National Committee on Student Branches I send you greetings.

"Nearly 40 years ago Branches were formed for bringing to the student the experience of older engineers and the professional attitude and understanding which may aid him in his future career. The reason why the Institute became interested in the development of men as well as technical matters was the rapid growth of the electrical industry and the increasing demand for competent engineers. The coming need of competent men is greater now than then.

"Just how can you make your Branch serve you in preparing you for your future career? I say how can *you* do this; not your counselor, or remote committees or Institute officers, but *you*, you students?

"The Branch is peculiarly your own affair. Curricula and schedules are prescribed; you follow orders. But the Branch is yours to do with what you want to do. It gives opportunity for collective action; action nowadays is by groups and organizations; your technical programs may have their most fruitful results—their by-products—in orderly composition, in effective presentation, in thinking on your feet, in keen discussion and in the handling of a meeting. Student conventions in the Southern District (where 17 institutions were represented last month) and in the Middle Eastern District (the January meeting in Pittsburgh) as well as in our own District, have convinced me of the high quality students are attaining. But nearly all papers are technical. Yet engineers must be more than technical. In the corridor of Dunham Laboratory at Yale are these words by an engineer, a soldier, an editor, and an industrial executive.

"Engineers reach the limit of their usefulness from defects of character rather

than from want of technical attainments. Our greatest difficulty is to find courage, candor, imagination, large vision, and high ambition.

"Confirmatory is the result of a questionnaire responded to by many engineers which evaluates the qualities of the successful engineer as 25 per cent technical knowledge and skill and 75 per cent qualities listed by Colonel Prout. Now the 25 per cent is the concern of curriculum and professors' grades. The 75 per cent are personal qualities which it is your responsibility to develop. Are these matters simple and clear? What is their significance? If so much depends on nontechnical qualities why is this not a field for exploration by your Branch?

"Again, many of you are looking forward to belonging to the engineering profession. Just what does this imply? What is the difference between the engineering profession and technical employment? Should not your Branch become interested in the history, the present status, and the development of the engineering profession? How will professional organizations and codes of ethics and legal registration affect you?

"There are printed articles that may form a fruitful basis for your discussions. I want to urge your initiative and independent activity in exploring some of the nontechnical phases of engineering—those which may lead you to higher achievement and success.

"At the recent convention of the Southern District held at the University of Alabama it was voted that Branches should devote at least one meeting a year to professional topics and that papers for prizes be in two groups, one technical and one non-technical."

DISTRICT EXECUTIVE COMMITTEE MEETING

The executive committee of the North Eastern District held a luncheon conference and business meeting at which various matters of business and plans for future activities were discussed. Action was taken establishing August 1 as the closing date for the submission of student papers for District prize awards for the preceding academic year.

The North Eastern District meeting and Student Branch convention for 1942 is scheduled to be held in Schenectady, N. Y.

This meeting was attended by the following delegates:

Everett S. Lee, vice-president, AIEE
R. G. Lorraine, secretary, North Eastern District
Eric A. Walker, chairman, District committee on student activities

Robert W. Adams, chairman, Boston Section
L. I. Albert, chairman, Tufts College Branch
H. A. Baines, chairman, Providence Section
E. A. Gruppe, chairman, Syracuse Section
M. G. Northrop, chairman, Ithaca Section
O. E. Sawyer, secretary, Providence Section
J. P. Wood, secretary, Ithaca Section
T. T. Woodson, secretary, Schenectady Section

Also in attendance at the meeting were President R. W. Sorenson, H. H. Henline, national secretary, New York, F. N. Tompkins, ex-chairman of Providence Section, Ex-Vice-President C. L. Dawes, Program Chairman E. B. Alexander of the Niagara Frontier Section, V. Siegfried, vice-chairman of the membership committee, G. W. Dunlap, delegate for Schenectady Section, W. K. Parks, secretary of Niagara Frontier Section, W. F. Cotter, chairman of the Rochester Section, G. W. Eighmy, chair-

man of the Niagara Frontier Section, and W. Irving Middleton, secretary of the Boston Section.

PRIZES AWARDED

Prizes awarded at Rochester to authors of technical papers included the following:

1. District prize for 1939-40 for initial paper—to H. R. Meahl, P. C. Michel, M. W. Sheldor and T. M. Dickinson, for their paper "Measurements at Radio Frequencies," presented at the 1940 summer convention.

2. District prize for 1939-40 for best paper—to W. Mikelson and H. W. Bousman for their paper "Rapid-Recording A-C Bridge," presented at the 1940 summer convention.

3. District prize for 1939-40 for the best Student Branch paper—to T. F. C. Muchmore for his paper "A Study of Fluorescent Lamps" presented at the North Eastern District Student Convention, May 1940.

4. District honorable mention for Student Branch paper for 1939-40—to H. T. Marcy of Massachusetts Institute of Technology, Cambridge, for his paper "Measurement of Quadrature Synchronous Reactance Using Negative Excitation."

In addition to the foregoing more formal awards, the District maintained its tradition by making the following awards to enrolled students on the basis of the oral presentation of their papers at the Rochester meeting:

First prize, graduate session, to Burton P. Brown, Jr.
First prize, undergraduate communications session, to W. A. Knoop, Jr.

Second prize, undergraduate communications session, to A. W. Chodakowski and F. W. Ziegler

First prize, undergraduate power session, R. A. Muir and G. T. Douglass
Second prize, undergraduate power session, Stephen J. O'Neil

TECHNICAL SESSIONS

With the exception of the following two items subsequently added, the content of the technical program was in accordance with that published on page 177 of the recent April issue of *ELECTRICAL ENGINEERING*:

DP. Secondary Networks for Supplying Power Plant Auxiliaries, H. G. Barnett, Westinghouse Electric and Manufacturing Company.

DP. Carrier-Current Relay Equipment and Its Other Uses, S. L. Goldsborough, Westinghouse Electric and Manufacturing Company.

With these additions the technical program at Rochester was made up of 10 regular technical-program papers destined for *TRANSACTIONS* publication, 4 informal technical papers, and 4 technical addresses. In addition to these, of course, there were the 16 student technical papers and the various addresses on nontechnical topics. Average attendance at the technical sessions was about 75 or 80. The only parallel sessions were two of the student sessions.

A variety of prearranged inspection trips was available through the co-operation of the Rochester Telephone Corporation, the University of Rochester Medical School and the Physics and Optical Laboratories, the Rochester Products Division of the General Motors Corporation, the Rochester Gas and Electric Corporation, the Eastman Kodak Company, and other organizations.

In addition to the annual District banquet, the social and entertainment features offered included a smoker for the men and a paralleling dinner-bridge party for the women, various sight-seeing trips, and a general luncheon for students and others.

Section and Branch Activities—Annual Report for 1940-41

THE following constitutes the annual report on Institute Section and Branch activities for the fiscal year which ended April 30, 1941. Similar information for three preceding fiscal years appeared in ELECTRICAL ENGINEERING for June 1940, pages 250-3; June 1939, pages 268-71; June 1938, pages 263-6.

Present members of the Sections committee and the committee on Student Branches, which supervise the two important divisions of Institute activities covered by this report, are:

Sections—M. S. Coover, *chairman*, W. B. Morton, *vice-chairman and secretary*, C. A. Faust, O. W. Holden, E. T. Mahood, R. M. Pflazgraff, H. H. Race, I. Melville Stein, J. M. Thomson, W. H. Timbie, and *ex-officio* the chairmen of all Sections of the Institute.

Student Branches—H. W. Bibber, *chairman*, S. S. Atwood, W. C. DuVall, E. A. Loew, A. Naeter, C. W. Ricker, Charles F. Scott, E. M. Strong, R. G. Warner, and *ex-officio* all Student Branch counselors.

SECTION ACTIVITIES

Two new Sections were organized: Arizona, including the entire state, which had been within the territory of the Los Angeles Section, and South Bend, to which was assigned territory previously in the Chicago, Fort Wayne, and Michigan Sections. These made a total of 10 new Sections organized within the past four years.

On account of the extensive territories involved, the names of two Sections were changed: Charleston to West Virginia, and El Paso to New Mexico-West Texas.

President Sorensen visited a large number of Sections, and his address "Engineering Horizons, Limited", illustrated with many lantern slides, which was given in most cases, was received with unusual enthusiasm, as shown by the close attention of all audiences and a large number of complimentary comments received by the national secretary.

Two Sections reported no activity. Eight Sections held more than 15 meetings each, 9 held from 12 to 15, 38 held from 8 to 11, 10 held from 4 to 7, and 6 held from 1 to 3.

Doctor J. O. Perrine, assistant vice-president, American Telephone and Telegraph Company, addressed meetings of a considerable number of Sections with attendance as high as 3,230, and more than 1,000 at the majority of the meetings.

Fourteen Sections, which held a total of 132 Section meetings, also held 103 technical-group, committee, or other special meetings. The average attendance at 42 of these was at least 50 per cent of the average at the Section meetings, showing the

continuing popularity of the more specialized meetings.

Many of the Sections held meetings devoted to national defense subjects. The

Sections responded splendidly in supplying information needed in the Institute's co-operation with other societies in the census of engineering firms and the selection of ad-

Table II. Section Meetings Held During Year Ending April 30, 1941

Section	AIEE Members		Meetings During Year			AIEE Members	Meetings During Year				
	August 1939	August 1940	Number	Average Attendance	Average Attendance as Per Cent of Membership, August 1940		August 1939	August 1940	Number	Average Attendance	Average Attendance as Per Cent of Membership, August 1940
Akron	75	85	7	74	87	Niagara Frontier	201	197	9	65	33
Alabama	31	40	2	27	67	North Carolina	85	91	2	104	114
Arizona*			1	41		North Texas	140	170	10	511	300
Boston	414	415	8	168	40	Oklahoma City	120	117	10	299	256
Central Indiana	126	132	7	117	89	Philadelphia	610	650	9	200	31
Chicago	733	769	6	198	26	Pittsburgh	517	564	10	221	39
Industrial group			3	114		Technical meetings			2	126	
Power group			4	137		Pittsfield	178	192	8	778	405
Communication group			3	167		Technical meetings			5		
Cincinnati	180	207	8	172	83	Colloquium meetings			4	42	
Cleveland	298	332	8	149	45	Popular meetings for high-school students			5	800	
Technical group			6	82		Portland	151	176	9	69	39
Columbus	95	92	11			Communication committee			4	41	
Connecticut	265	279	9	91	33	Transmission and distribution committee			4	69	
Denver	182	192	10	61	32	Providence	91	99	8	64	65
East Tennessee	118	132	10	46	35	Rochester	95	103	12	89	86
Erie	65	57	10			St. Louis	268	273	9	393	144
Florida	73	78	3	92	118	San Antonio	43	45	7	44	98
Fort Wayne	98	109	8	93	85	San Diego	30	36	9	29	81
Georgia	104	109	6	90	83	San Francisco	486	507	12	129	25
Houston	139	141	10	234	166	Technical meetings			5	87	
Iowa	67	72	8	88	122	Saskatchewan	21	15	6	8	53
Ithaca	51	51	9			Schenectady	403	434	10	113	26
Kansas City	125	148	9	166	112	Technical discussions			3	173	
Lehigh Valley	191	191	8			Seattle	153	164	10	82	50
Los Angeles	483	506	8	146	29	Technical group			2	55	
Louisville	56	61	10	36	59	Electronics group			1	80	
Lynn	145	147	5	900	610	Sharon	86	105	9	133	127
Inspection trips			4			South Bend**			3		
Technical lectures			5			South Carolina	37	33	36	97	
Local conventions			2			Spokane	62	81	12	39	48
Madison	65	67	8	87	130	Springfield	60	57	9	91	160
Rock River Valley Subsection			6	40		Syracuse	71	75	6	130	173
Mansfield	64	68	9	113		Toledo	78	71	11	101	142
Maryland	224	252	11	124	49	Toronto	338	342	14	211	62
Memphis	61	72	10	45	63	Tulsa	107	94	8	121	129
Mexico	56	56				Urbana	77	76	6	175	230
Michigan	358	376	8	179	48	Utah	76	76	12	52	68
Round-table discussions			1			Idaho technical committee			6	26	
Milwaukee	270	280	8	144	51	Vancouver	107	97	11	42	43
ESM meetings			1	200		Virginia	94	111			
Minnesota	89	107	11	97	91	Washington	332	370	14	138	37
Power group			1	30		Junior technical sessions			19	35	
Montana	39	36	6	127	128	West Virginia	48	5	37	77	
Muscle Shoals	46	33	9	49	148	Wichita	46	52	10	150	289
Nebraska	56	48	5	48	100	Worcester	58	63	8	58	92
New Mexico-West Texas			47	9	79	Total	72	14,078	14,844		
New Orleans	97	123	8	58	48	Total number of meetings			703		
New York	3,355	3,346	5	460	14	Total attendance			92,554		
Communication group			3	123							
Basic Science group			6	137							
Power group			12	209							
Illumination group			2	173							
Transportation group			3	342							

* Organized March 22, 1941.

** Organized February 26, 1941.

Table III. Branch Meetings Held During Year Ending April 30, 1941

Branch	Meetings During Year			Meetings During Year			
	Number	Average Attendance	Approximate Number of Talks by Students	Number	Average Attendance	Approximate Number of Talks by Students	
Akron, University of	4	26	1	Newark College of Engineering	10	40	5
Alabama Polytechnic Institute	8	34	1	New Hampshire, University of	6	22	1
Alabama, University of	11	24	4	New Mexico State College	13	15	12
Alberta, University of	10	23	14	New Mexico, University of	12	13	7
Arizona, University of	22	9	16	New York, College of the City of			
Arkansas, University of	15	22	16	Day division	22	48	1
British Columbia, University of	6	25	10	Evening division			
Brooklyn, Polytechnic Institute of				New York University			
Day division	15	64	2	Day division	4	26	
Evening division	9	28	1	Evening division	9	16	
Brown University	2	48		North Carolina State College	14	46	3
Bucknell University	4	12		North Dakota Agricultural College	6	12	4
California Institute of Technology	15		3	North Dakota, University of	12	16	3
California, University of	27	34	7	Northeastern University	12	69	6
Carnegie Institute of Technology	29	50	20	Northwestern University	7	37	1
Case School of Applied Science	4	27	2	Norwich University**	1	33	
Catholic University of America	2	27		Notre Dame, University of	8	33	2
Cincinnati, University of	11	91	8	Ohio Northern University	8	42	1
Clarkson College of Technology	3	14		Ohio State University	13	36	8
Clemson Agricultural College	13	38	18	Ohio University	7	15	1
Colorado State College	6	20	4	Oklahoma A&M. College	12	287	2
Colorado, University of	9	172	1	Oklahoma, University of	9	42	2
Columbia University	5	22		Oregon State College	12	59	8
Connecticut, University of*	3	68		Pennsylvania State College	6	185	
Cooper Union				Pennsylvania, University of	4	70	6
Day division	4	24		Pittsburgh, University of	24	89	23
Evening division	13	28	5	Porto Rico, University of	1	43	
Cornell University	5	27		Pratt Institute	13	47	4
Denver, University of	6	35		Princeton University	1	17	
Detroit, University of	7	72	1	Purdue University	12	103	
Drexel Institute of Technology	10	16	3	Rensselaer Polytechnic Institute	6	46	
Duke University	9	23		Rhode Island State College	11	24	
Florida, University of	2	28	2	Rice Institute	13	36	4
George Washington University	5	63	3	Rose Polytechnic Institute	6	23	3
Georgia School of Technology	5	61		Rutgers University	5	22	3
Harvard University	6	28	5	Santa Clara, University of	11	18	8
Idaho, University of	11	25	2	South Carolina, University of	3	23	
Illinois Institute of Technology	14	46	4	South Dakota State College	17	17	8
Illinois, University of	9	168		South Dakota State School of Mines	7	16	
Iowa State College	10	114		Southern California, University of	14	28	10
Iowa, University of	27	42	28	Southern Methodist University			
Johns Hopkins University	15	26	16	Stanford University	14	31	
Kansas State College	12	178	3	Stevens Institute of Technology			
Kansas, University of	8	38	2	Swarthmore College	2	17	
Kentucky, University of	23	62	2	Syracuse University	7	16	7
Lafayette College				Tennessee, University of	5	24	
Lehigh University	6	48	1	Texas A. and M. College	11	48	5
Louisiana State University	8	23	2	Texas Technological College	10	29	1
Louisville, University of	2	19	1	Tufts College	5	32	
Maine, University of	10	16	4	Tulane University	10	26	6
Manhattan College†	1			Union College	5	53	
Marquette University	8	25	2	Utah, University of	15	34	10
Maryland, University of	7	24	7	Vermont, University of	10	19	5
Massachusetts Institute of Technology	3	42		Villanova College	5	12	3
Michigan College of Mining and Technology	8	31	2	Virginia Military Institute	3	44	6
Michigan State College	12	32		Virginia Polytechnic Institute	19	51	9
Michigan, University of	6	44		Virginia, University of			
Milwaukee School of Engineering	3	57	1	Washington, State College of	15	52	4
Minnesota, University of	11	33	3	Washington, University of	10	55	3
Mississippi State College	5	32	1	Washington University	13	26	
Missouri School of Mines and Metallurgy	9	33	7	West Virginia University	14	36	62
Missouri, University of	8	35	3	Wisconsin, University of	5	60	1
Montana State College	28	29	89	Worcester Polytechnic Institute	2	50	6
Nebraska, University of	18	50	12	Wyoming, University of	9	45	1
Nevada, University of	12	23	3	Yale University	7	30	1
Total	123 Branches			Total number of meetings	1,163		
				Total attendance	52,285		

* Authorized by board of directors, January 30, 1941.

† Authorized by board of directors, January 30, 1941.

** Authorized by board of directors, May 24, 1940.

visors to district co-ordinators in the defense contract service.

A comprehensive summary of Section activities during the year 1939-40, based on replies to questionnaires prepared by the Sections committee, was published in the October issue of ELECTRICAL ENGINEERING, pages 425-8. This includes a table showing in detail the many types of activities in which 54 Sections participate.

Table IV. Branch Meetings Held During Last Three Fiscal Years

	Fiscal Year Ending April 30		
	1939	1940	1941
Number of Branches	120	121	123
Number of meetings held	1,190	1,346	1,163
Average number of meetings	9.9	11.1	9.5
Total attendance	53,380	64,972	52,285
Average attendance per meeting	44.8	48.3	45.0
Number of student talks	725	767	608

Table V. Conferences on Student Activities

District	Location	Date
1	Rensselaer Polytechnic Institute, Troy, N. Y.	5/3-4/40
8 and 9, University of British Columbia	Los Angeles, Calif. (Pacific Coast convention)	8/27-30/40
2	Cincinnati, Ohio (Middle Eastern District meeting)	10/9-11/40
4	University of Alabama, University, Ala.	4/3-5/41
6	University of Denver, Denver, Colorado	4/18-19/41
7	University of Missouri, Columbia, Mo.	4/28-29/41
1	Rochester, N. Y. (North Eastern District meeting)	4/30-5/2/41

Table VI. Student Conventions

Sponsor (District, Section, or Branch)	Location	Number of Student Papers
1	Rensselaer Polytechnic Institute, Troy, N. Y.	5/3-4/40
8 and 9, University of British Columbia	Los Angeles, Calif. (Pacific Coast convention)	8/27-30/40
4	University of Alabama, University, Ala.	4/3-5/41
6	University of Denver, Denver, Colo.	4/16-18/41
3 and New York Section	Rutgers University, New Brunswick, N. J.	4/24/41
7	University of Missouri, Columbia, Mo.	4/28-29/41
2	University of Pennsylvania, Philadelphia, Pa.	4/28/41
1	Rochester, N. Y. (North Eastern District meeting)	4/30-5/2/41

In an effort to measure the value to the Sections of the surveys of Section activities made during the past few years, the committee distributed a questionnaire in April. A report based on the responses will be discussed at the conference of officers, delegates, and members at the 1941 summer convention in Toronto.

In September 1940, only 93 members of the Institute within the United States were outside of Section territories. Section membership records as of August 1, 1940, gave the total membership of the Sections in the United States as 14,338.

The Sections committee has continued its study of unassigned territory with the object of recommending further revisions when desirable. The other activities of the Sections committee have included the adoption of a trial plan for publishing information on Section meetings in *ELECTRICAL ENGINEERING*, plans to develop greater interest among the Sections in vocational guidance, and efforts to develop more effective distribution of the pamphlets "The Electrical Engineer" and "Engineering—A Career, a Culture".

Table I contains detailed information regarding membership and meetings of the individual Sections, table II shows a comparison over the past three years, and table VII shows the extent of student participation in Section and joint Section and Branch meetings.

STUDENT ACTIVITIES

New Student Branches were organized at the University of Connecticut, Storrs; Norwich University, Northfield, Vt.; and Manhattan College, New York, N. Y. Armour Institute of Technology and Lewis Institute, both in Chicago, were combined under the name Illinois Institute of Technology, and therefore the two Student Branches were combined into the Illinois Institute of Technology Branch. The total number of Branches at the end of the year was 123.

The students have continued their keen interest in presenting papers at the Pacific Coast convention and District meetings, presenting 11 papers in 2 sessions at the Pacific Coast convention, and 16 papers in 3 sessions at the North Eastern District meeting, in Rochester. As shown in table VII, 30 Branches co-operated with 20 Sections in holding 21 Section or joint Section and Branch meetings in which students presented 67 papers.

Only one Branch failed to report any activity during the year. Thirteen Branches held more than 15 meetings each, 27 held from 12 to 15, 30 held from 8 to 11, 36 held from 4 to 7, and 16 held from 1 to 3.

The total number of Branch meetings held during the year was 1,163, and 608 student talks were presented, both numbers being considerably lower than those for the preceding year. Although 9 Branches had 15 or more student talks, and 27 had from 5 to 14, 52 had only from 1 to 4, and 35 had none.

Of 1,641 Enrolled Students whose terms were expected to expire on April 30, 1941, 887 or about 54 per cent applied for admission as Associates. The records for the preceding year were 1,624, 911, and about 56 per cent. Tables III, IV, V, VI, and VII contain detailed information on Branch meetings, District conferences, student conventions, and student participation in Section and joint Section and Branch meetings.

Table VII. Section or Joint Section and Branch Meetings With Active Student Participation

Sections	Branches	Date	Student Talks	Attendance
Cincinnati.....	University of Cincinnati.....	5/9/40	4.....	195
New Orleans.....	{ Louisiana State University }.....	5/13/40	2.....	70
Worcester.....	Tulane University.....	5/14/40	5.....	65
Oklahoma City.....	Worcester Polytechnic Institute.....	5/15/40	1.....	127
St. Louis.....	{ University of Missouri and Metallurgy }.....	5/17/40	6.....	110
Portland.....	Washington University.....	5/18/40	3.....	99
Tulsa.....	Oregon State College.....	5/18/40	4.....	70
Utah.....	{ University of Arkansas Oklahoma A. and M. College }.....	5/18/40	3.....	44
Florida.....	University of Utah.....	5/20/40	2.....	56
Pittsburgh.....	{ University of Florida Carnegie Institute of Tech. }.....	12/27/40	4.....	292
Akron.....	Pennsylvania State College.....	1/14/41	4.....	68
Toronto.....	University of Pittsburgh.....	1/20/41	4.....	82
Vancouver.....	West Virginia University.....	3/3/41	3.....	51
Los Angeles.....	{ University of California California Institute of Tech. }.....	4/8/41	5.....	120
Houston.....	{ University of Southern Calif. Texas A. and M. College }.....	4/9/41	5.....	68
Seattle.....	Rice Institute.....	4/14/41	2.....	56
Cleveland.....	University of Washington.....	4/17/41	3.....	82
New Orleans.....	Case School of Applied Science.....	4/18/41	2.....	39
Minnesota.....	Tulane University.....	4/22/41	4.....	60
Louisville.....	University of Minnesota.....	4/25/41	1.....	40
San Francisco.....	{ University of Louisville University of Santa Clara }.....	4/25/41	3.....	80
Totals—20 Sections, 30 Branches, 21 Meetings.....				67.....1,874

Development Company; and H. B. Fischer, Bell Telephone Laboratories, Inc., which was presented at the 1940 winter convention and published in the 1940 TRANSACTIONS, pages 849-58.

Best Paper in Theory and Research: Prize awarded to E. C. Starr (M'29), Oregon State College, for his two papers "High-Voltage D-C Point Discharges" and "Aircraft Precipitation-Static Radio Interference", presented at the summer convention, June 24-28, 1940, and published in the 1941 TRANSACTIONS, pages 356-62 and 363-70. Honorable mention was made of the paper "Theory of Hysteresis Motor Torque" by B. R. Teare, Jr. (A'29, M'36), Carnegie Institute of Technology, which was presented at the 1940 winter convention and published in the 1940 Transactions, pages 907-12.

Initial Paper: Prize awarded to V. E. Legg (M'37), and J. F. Given (A'28), Bell Telephone Laboratories, Inc., for their paper "Compressed Powdered Molybdenum Permalloy for High-Quality Inductance Coils", presented at the winter convention and published in the 1940 TRANSACTIONS, pages 865-72.

Branch Paper: Prize was awarded to W. H. Huggins (Enrolled Student) Oregon State College, for his paper "A Stabilized Neon-Tube Direct-Coupled Amplifier", presented at a joint meeting of the Portland Section and the Oregon State College Branch, May 18, 1940. Honorable mention was made of the paper "A New Device for Slip Determination" by W. R. Chynoweth (Enrolled Student) University of Missouri, which was presented at a joint meeting of the St. Louis Section and the Missouri School of Mines and Metallurgy, University of Missouri and Washington University Branches, May 17, 1940.

Awards being made by the various Districts for 1940 papers will be announced in future issues, as the information becomes available.

1941 Lamme Medal Nominations Due December 1

Special attention is directed to the fact that the names of Institute members who are considered eligible for the AIEE Lamme Medal, to be awarded early in 1942, may be submitted by any member in ac-

National • • •

Committee Announces 1940 AIEE National Prize Awards

National prize awards for papers presented during 1940 have been announced by the AIEE committee on the award of Institute prizes. The committee had the benefit of recommendations on all except Branch papers from the chairmen of technical committees, and selection was made from all eligible papers presented in 1940. No award is being made for best paper in public relations and education as no eligible papers in this category were presented during 1940. The prizes will be awarded at the annual meeting of the Institute, June 17, 1941, during the coming summer convention at Toronto, Canada.

The announcement was made by P. L. Alger, acting chairman of the committee, for J. W. Barker, chairman. Other members of the committee are W. F. Davidson and D. M. Simmons.

Papers receiving awards in the several classifications, and their authors, are:

Best Paper in Engineering Practice: Prize awarded jointly to D. R. Shoultz (A'35), M. A. Edwards (M'40), and F. E. Crever (A'37), of the General Electric Company, for their paper on "Industrial Applications of Amplitude Generators", presented at the winter convention, January 22-26, 1940, and published in the 1940 TRANSACTIONS, pages 944-9; and to J. W. Milnor (A'13, F'30) of the Western Union Telegraph Company, for his paper on "Control of Inductive Interference Telegraph Systems", presented at the 1940 winter convention and published in the 1940 TRANSACTIONS (August section), pages 469-74. Honorable mention was made of the paper "The Development of the Civil Aeronautics Authority Instrument Landing System at Indianapolis", by W. E. Jackson, Civil Aeronautics Authority; A. Alford (A'39) and P. F. Byrne, International Telephone

Future AIEE Meetings

Summer Convention
Toronto, Canada, June 16-20, 1941

Pacific Coast Convention
Yellowstone National Park, August 27-29, 1941

South West District Meeting
St. Louis, Mo., October 8-10, 1941

Southern District Meeting
New Orleans, La., December 3-5, 1941

Winter Convention
New York, N. Y., January 26-30, 1942

table conference of the Edison Electric Institute, AIEE Chicago Section, and Commonwealth Edison Company, Chicago, Ill., May 5. Mr. Scott discussed technical advances in the use of Styrene, a new insulating material being used for emergency repairs in power-cable installations damaged by air raids, which he has demonstrated before representatives of power companies in various American cities.

Mr. Scott's trip to the United States has been arranged by International Standard Electric Corporation, supply and manufacturing division of International Telephone and Telegraph Corporation, of which Standard Electric is the principal British associate, with special permission of the British Government.

Mont, president, DuMont Laboratories, Passaic; T. M. Hunter (A'15, M'28) president, American Transformer Company, Newark; Robert B. Litchfield, (A'17) equipment engineer at New Jersey Bell Telephone Company, Newark, awarded a first prize of \$25.00 to Mr. Blechman, a second prize of \$10.00 to Mr. Lester, and honorable mention jointly to Mr. Dehn and Mr. Dolan. The judges themselves contributed a purse of \$10.00 to be divided between the winners of honorable mentions, because of the closeness of the competition.

R. C. Muir (A'08, F'36) vice-president in charge of engineering for the General Electric Company, revealed the depth of his interest in student engineering activities by taking time out of his busy schedule to serve as the feature speaker for the general banquet. In speaking on the topic "The Electrical Engineer in Industry," Mr. Muir briefly reviewed the nature and significance of the more important electrical engineering developments, stressing both the technical and the human or sociological aspects. In fact, he laid special emphasis upon the latter, defining the difference between a technician and a professional engineer in terms of the balance achieved by the individual between a knowledge of purely technical matters on the one hand and an understanding of human relationships on the other hand. Mr. Muir ventured the suggestion that a fully successful career as a professional engineer and citizen might very well require a foundation comprising something like 25 per cent good technical education and as much as 75 per cent in knowledge and understanding of human relations.

Guests of Honor at the banquet in addition to Mr. Muir included Dean P. H. Daggett of the college of engineering, Rutgers; Student Branch Counselor Frederic P. Fischer of Rutgers University; President Robert C. Clothier of Rutgers University; National Secretary H. H. Henline and Editor G. Ross Henninger from AIEE headquarters, New York; and Chairman J. F. Fairman of the New York Section. Mr. Fairman gave a particularly stimulating and challenging extemporaneous message to the students at the banquet, the essential substance of which is reflected in the transcript appearing on these pages under the title "Democracy, Like Charity, Begins at Home."

Branch • • •

Third District Students Meet at Rutgers

With a reported total of 320 persons in attendance, the 15th annual student convention of the Institute's third District was held April 24, 1941 at Rutgers University, New Brunswick, N. J. A busy full day's program provided for the presentation and discussion of 7 student technical papers during the morning session, a variety of inspection trips to near-by points of technical interest during the afternoon, and an informal banquet in the evening.

The technical program included the following papers:

"Vacuum Tube Constants by Oscillograph." Loebe Julie, College of the City of New York
"Generation and Application of Square Waves." Gabriel Blechman, New York University
"An Electronic Frequency Meter." Rudolph Dehn, Newark College of Engineering
"Electric Power Requirements for National Defense." George Gilmore, Pratt Institute
"The Barkhausen Effect in Ferromagnetism." Edward Barlow, Cooper Union
"Design and Construction of a Vacuum-Tube Voltmeter." A. J. Dolan, Brooklyn Polytechnic Institute
"Synthesis of Electric Wave Shapes by Electronic Means." Burton R. Lester, Rutgers University

A special jury consisting of Allen B. Du-

1941 Year Book Issued

The 1941 edition of the AIEE Year Book has been issued, in accordance with 1940-41 budget provisions. Addresses are corrected as of February 28, 1941. Copies have already been distributed to all national, District, and Section officers, Student Branch counselors, and all members of national committees. Other members desiring copies may obtain them by writing to the AIEE order department, 33 West 39th Street, New York, N. Y. The Year Book is not available to nonmembers of the Institute, nor is its use permitted for commercial, promotional, or other circularization purposes.

Section • • •

Institute Groups Hear English Engineer

T. R. Scott, chief engineer, power cable division, Standard Telephones and Cables, Ltd., London, Eng., addressed the power group of the AIEE New York Section, New York, N. Y., April 29, 1941, the round-table group of the Michigan Section, Detroit, Mich., May 2, and a round-

Democracy, Like Charity, Begins at Home

A Challenge to Students—and Others

IF WE believe in our Code of Professional Ethics, let's live up to it, not just talk about it. Democracy, in the Institute, or in the nation, can't be made for us; we must make it. Let's really go to work for Democracy—which, like charity, begins at home; we can't afford to continue to 'let George do it', as the classic phrase goes." So challenged Chairman J. F. Fairman of the New York Section in speaking before a group of some 300-odd Enrolled Students at the recent AIEE District 3 student convention at Rutgers University. The essential substance of his thought-provoking

extemporaneous comments is reflected in the following approximate transcript.

INSTITUTE LOOKS TO YOUTH

It has been my good fortune to have attended a number of these student conventions in recent years, and I always come away wondering why the members of the Institute, as they grow older, can't retain some of the spontaneity and enthusiasm which characterizes these Student Branch activities.

Heretofore, my presence has not been sufficiently official to afford me an opportu-

nity to speak to the gathering. Hence, I can't forego this long awaited chance to relieve my mind of the burden of some thoughts that I have been storing. Perhaps something of what I say will stick with some of you and lead you to carry over more of your present enthusiasm and high ideals into your future work in the Institute and in your profession.

You will understand better what is behind my wishful thinking for the future of the Institute in your hands when I tell you that, although the New York Section has nearly 3,500 members, your meeting with something over 300 in attendance is larger by far than three out of the four general Section meetings held this year. The bright spots in New York Section activities are the meetings sponsored by the five technical groups and I ascribe this to the fact that these groups were organized by, for, and of the younger element. They were designed to give the young engineers a forum for the exchange of ideas and experiences in the fields of their special interests and they are doing so good a job and are having such interesting meetings that the older men are attending them in preference to the general Section affairs. In my opinion, this is all to the good and I believe the time is not far distant when the youth movement will take over the Section itself and show the elder statesmen how to run it as it should be run.

Some of the other large Sections throughout the country have similar divisions of their work, adapted to the interests of their members. Wherever you may be located when you leave school and get a job, go to the local Section meetings, find out how the work is organized, and volunteer for service in whatever activity interests you, or whatever activity seems to need your help. Don't wait to be asked. You probably won't be. Volunteer.

WHAT IS DEMOCRACY?

This brings me to the next thought. Most of you are shortly going to be handed a tin hat and a gun and taught how to do squads right, or whatever its modern equivalent is, in order to prepare you, if need be, to help defend Democracy. Maybe you know what Democracy is. I hope you do, and that you think it is worth defending. Perhaps some of you have been wondering a bit, as many of us who went through the same motions some 20-odd years ago have been wondering, just what it's all about. Just what is this Democracy we talk about so glibly? How do you get it and, more important, how do you *keep* it?

Make no mistake about this—I shall not presume to tell you, because I am not sure that I know. Nevertheless, I am quite sure that some of the things done in its name are not democratic, and indeed definitely bear the earmarks of a type of political philosophy we are supposed to be "neutral against". I shall give you just one concept that I keep coming back to in my own thinking. If it appeals to you as a foundation stone, you might build on it.

To me, Democracy implies that each of us to the full extent of his time and ability and taking into account his special talents, does his share in promoting the common welfare of every group of which he is a part or with which he is connected directly or indirectly. To me, Democracy, like charity,

literally begins at home. It begins in the family group, the school, the college, the Student Branch and the Section of the Institute, the fraternal organization, the club, the various civic and charitable organizations, the church, and in all the other organized activities of a community. If, working together, we can make a success of such activities, it should be easy to make Democracy work in the broader fields of state and national affairs; yes, even in the very broad field of international affairs. If we can't or won't, then in my opinion we shall lose this thing called Democracy and we shall deserve to lose it.

WHY "LET GEORGE DO IT"?

If I am anywhere near right in this, my understanding of Democracy and the democratic process, I believe we have not far to go to find the reason for our present fears that our democratic system is in danger. We and many other people have not been working at it. We have largely "left it to George," and George has been a very busy man. Being busy, he had to take some shortcuts. Also, since nobody stopped him, he has been trying out some ideas of his own and naturally enough, they were principally directed to the greater glory of George. We can't blame George. He probably did the best he could. Unfortunately, we don't like the results and certainly we don't like George as well as we did.

I think we have been lazy in passing the buck to George on important matters of public interest. I think we should actively carry our own individual and definite responsibilities of citizenship.

Are you fellows going to play golf on Election Day, all day, as so many of your elders have done, in the mistaken and lazy belief that "one vote more or less won't make any difference to anybody?" Are you going to crab about how the Institute is run, and do nothing about it but crab. Are you going to stay away from church, asserting that it is full of hypocrites who would taint your pure souls? Are you—but why go on? You have to make your own answers, and you will have to live with the consequences of your action or inaction.

Just one more thought before I conclude these rambling remarks. It seems that one school of thought assigns to technology (and that means engineers) the blame for the dislocation of our economic system. Before I got to thinking about George and his place in the scheme of things, that allegation used to annoy me very much. I was sure somebody else was to blame. Now I'm not so sure. Perhaps we have been leaving part of our job to George, and hence are partly responsible for the results.

Within the last few days, our AIEE editor asked me to review two papers, each presented by a distinguished member of the Institute before his Section. The two Sections are well separated geographically, but the authors are poles apart in thought and philosophy. Both papers were well written. I hope both will be published. But the thing that startled me wide awake was the radically different conclusions reached by these two distinguished gentlemen, starting with substantially the same facts.

What is wrong with our engineering processes when that can happen? I was brought up to believe, as an engineer—and I suppose your professors still so teach you

—that if all the facts are in our possession, we should be able to reason to a sound and logical conclusion, and that generally only one real answer is possible. Of course, sometimes in mathematical processes the answers can be negative or imaginary, and in such instances you know how to interpret them or what to do with them. Apparently, in the case of these authors, the imaginary answers had too strong an appeal entirely to be resisted. Consequently, their conclusions were colored accordingly and very beautifully colored, too. But that's not the engineering process, that's the kind of special pleading that all too frequently characterizes political and other aspects of human affairs. Gentlemen, as engineers, let's leave such specious special pleading to others. Let's content ourselves with being honest.

After reading those papers, I looked up our Code of Principles of Professional Conduct. Like these authors, I hadn't read it recently either. I want to read you a few selected paragraphs from that code:

"In all of his relations the engineer should be guided by the highest principles of honor."

"The engineer should endeavor to assist the public to a fair and correct general understanding of engineering matters, to extend the general knowledge of engineering, and to discourage the appearance of untrue, unfair, or exaggerated statements on engineering subjects in the press or elsewhere, especially if these statements may lead to, or are made for the purpose of, inducing the public to participate in unworthy enterprises."

"It is unprofessional to give an opinion on a subject without being fully informed as to all the facts relating thereto and as to the purposes for which the information is asked. The opinion should contain a full statement of the conditions under which it applies."

"An engineer in responsible charge of work should not permit nontechnical persons to overrule his engineering judgments on purely engineering grounds."

I submit that such a code has something vital to do with Democracy. If we believe in it, if we have any pride in and respect for our profession and ourselves, let's not just talk about these principles, let's have the courage to live up to them.

Conference on Student Activities Held by District 6 at Denver

The 14th annual conference on student activities of AIEE District 6 was held at the University of Denver, Denver, Colo., April 18-19, 1941. Nine colleges and universities were represented at the conference, which had a total registration of 124 students and faculty members. The program included a dinner meeting with the AIEE Denver Section at which President R. W. Sorensen, District Vice-President A. L. Turner, and Doctor J. M. Gage, University of Colorado, were speakers; two technical sessions; business meetings of Branch counselors and Branch chairmen; and a final session at which President Sorensen was speaker and District prizes for papers were announced.

The business meeting of counselors voted to hold the 1942 conference at Colorado State College, Fort Collins, on April 24 and 25. The conference was previously scheduled to be held at South Dakota State School of Mines, Rapid City, but a change was requested by Professor J. O. Kammerman, counselor of that Branch, who is

absent because of military service. Professor F. B. Beatty, Colorado State College, was elected chairman of the District committee on student activities and counselor delegate to the 1941 summer convention. Professor H. S. Rush, North Dakota State College, was selected as alternate counselor delegate.

At the technical sessions, the following student papers were presented:

A METHOD OF MAGNETIZING SMALL PERMANENT MAGNETS, J. D. Smith and Art Siegal, University of Denver.

AUDIO CONTROL OF COLOR, F. A. Olson and H. B. Hansen, University of North Dakota (presented by Robert Smith).

FREQUENCY RESPONSE AND EFFICIENCY MEASUREMENTS OF A LOUDSPEAKER, F. H. Slaymaker, University of Nebraska.

AIRWAYS RADIO RANGES, Sam Phillips, University of Wyoming.

AMATEUR TELEVISION, Robert Barthlo and Vincent Winters, South Dakota State College.

APPLICATION OF THE AMPLIDYNE AS A VOLTAGE REGULATOR, W. C. Brown and R. H. West, University of Colorado.

GIORGIO MKS SYSTEM OF UNITS, Dean Hendrix, Colorado State College.

AN INVESTIGATION OF GRID AND PLATE CURRENTS IN THE FG-67 THYRATRON, Richard Nelson, South Dakota School of Mines.

EFFECTS OF ELECTRICITY ON THE HUMAN BODY, Gus Stroebel and Allen Barstad, North Dakota Agricultural College.

District prize for Branch paper was awarded to F. H. Slaymaker. W. C. Brown and R. H. West received first honorable mention, and J. D. Smith and Art Siegal second honorable mention.

Abstracts

TECHNICAL PAPERS are previewed in this section as they become available in advance pamphlet form. Copies may be obtained by mail by remitting price indicated to the AIEE order department, 33 West 39th Street, New York, N. Y., or at five cents less per copy if purchased at AIEE headquarters or at AIEE convention or District-meeting registration desks.

The papers previewed in this issue will be presented at the AIEE summer convention, Toronto, Canada, June 16-20, 1941.

Basic Sciences

41-107—Analytical Methods of Solving Discrete Nonlinear Problems in Electrical Engineering; E. G. Keller (M'40). 20 cents by mail. More often than not, the nonlinear problems of electrical engineering arise from discrete physical systems and are usually reducible mathematically to the solution of systems of nonlinear total differential equations or to systems of nonlinear integral equations. Six independent methods of solving discrete nonlinear problems are given in this paper. Each is illustrated by means of an electrical-engineering problem. The illustrative examples employed pertain to a-c and d-c nonlinear circuits, reluctance-induction motors, hunting of and dynamic braking of synchronous machines. References to additional methods are given in the bibliography. The 100 references listed represent approximately ten per cent of the field, but many of the entries contain bibliographies on their respective fields.

41-105—Diode Rectifying Circuits With Capacitance Filters; D. L. Waidelich (A'39). 25 cents by mail. This paper presents the results of an investigation of the half-wave and full-wave rectifier circuits with a simple capacitance filter and using either high-vacuum or mercury-vapor tubes. An equivalent circuit is set up, such that when the tube is conducting, a mercury-vapor tube is represented by a constant voltage drop or a high-vacuum tube by a constant resistance. A detailed analysis of this circuit is carried through in the appendix, and it is found that the output characteristics depend upon three parameters. The results of this analysis are presented in the form of curves giving the angles at which the tubes begin conducting and cease conducting and also the d-c output voltage. For the more special case of no tube drop, curves of ripple voltage, maximum tube current, and tube inverse peak voltage are presented. The comparisons made between the calculated results and test results show very satisfactory agreements. It is shown that the curves given in the paper may be used in the design of rectifier circuits with capacitance filters.

Communication

41-130—ACO—Sound Recording for the Amateur; A. L. Williams. 20 cents by mail. Many fields of technical development have appealed to the amateur, with the result that their amateur activities therein have contributed materially both to the progress of the art and to their own personal pleasure. Amateur radio and photography are notable examples, and the recent increase in interest in home recording gives promise that this field is now ripe for amateur exploitation. Both magnetic and disk recording are particularly well adapted to amateur interest, but due to the present-time difficulty of obtaining component parts for magnetic-recording systems, the amateur is advised to concern himself first with disk recording, where all of the component parts necessary for constructing a high-quality machine are already available. These component parts are discussed briefly. Disk material is considered, and some attention is given to recording characteristics suitable for amateur purposes.

41-129—The Measurement of Body Currents; Robert S. Schwab. 15 cents by mail. All living tissue has d-c potential differences between parts of different energy values. They are related to growth, metabolism, and the absorption of energy. Plants and all organs in animals show it. A-c potentials coming in distinct waves are found in tissues related to active motion. Muscle and nerves are electrically inactive except when stimulated. Heart is rhythmically electrically active in a special synchronous form. Brain and ganglion cells are continuously electrically active in an asynchronous way when healthy and awake; during sleep and in pathological states continuous synchrony develops. Death in all tissues is shown by total loss of both d-c and a-c potentials.

41-113—Radio Broadcasting in Canada; A. Frigon (A'20). 15 cents by mail. The development of radio broadcasting in

Canada has been very rapid. There are now 85 broadcast transmitters in daily operation. All broadcasting is under the control of the Canadian Broadcasting Corporation, an independent government corporation, which in addition to its regulatory functions operates a coast-to-coast network connecting for a nation-wide service its own 10 modern stations with almost half of the privately owned transmitters. It cannot therefore be said that radio in Canada is owned and operated by the Government, as the CBC is independent and free to apply its revenues derived from licenses and commercial operation in the best interests of its radio audience. The Canadian system is one of co-operation between a semipublic service and private ownership. Parliamentary inquiries have always found it the best suited to Canada's needs considering its vast area and relatively sparse population.

41-111—ACO—Phonograph Record Recording and Reproducing; A. D. Burt. 20 cents by mail. For the second time during the history of the phonograph, public interest has reached such proportions that the resultant business has become of great commercial importance. Mechanical reproducing means were concerned with the first period and electrical reproducing means with the second period. Laterally cut disks have provided the principal form used for the phonograph record. Only such historical information is included as relates specifically to the laterally cut record and the reproducing means employed. Improvement in phonograph reproduction can be obtained by designing to minimize the more obvious defects such as "wow," flutter, rumble, surface noise, and "needle chatter". The wider the reproduced frequency range becomes, the more important it is to minimize these defects. The paper illustrates how the use of the analogy between mechanical and electrical circuits facilitates the solution of the complicated mechanical and acoustical problems in this field.

Electrical Machinery

41-126—Transient Torques in Squirrel-Cage Induction Motors, With Special Reference to Plugging; E. S. Gilfilan, Jr. and Edward Kaplan. 30 cents by mail. When a squirrel-cage motor is switched in any way, whether while running or at rest, transient torques, which are usually several times the steady-state torque, occur and must be considered in design. It was desired to obtain a general semiquantitative view of these torques by considering a limiting case which is accessible analytically, with the expectation that a simple rule would be apparent for estimating the magnitude of these torques from design data. No such rule was found, and we must be content to exhibit limiting transient torque curves for certain types of motors in the commercial range and to provide accurate formulas for calculating such limiting torques for types not considered here.

41-127—Excitation Circuits for Ignitron Rectifiers; H. C. Myers and J. H. Cox (A'26). 20 cents by mail. The excitation of ignitron rectifiers can be accomplished by a

considerable variety of circuits. After some experience the types used commercially have narrowed down to a few. The anode-firing method, though simplest, does not provide sufficiently positive excitation to produce a desirable degree of balance in the larger installations. Separate excitation systems have been developed which use capacitor impulses controlled with thyratrons, rotating-impulse generators, and capacitor impulses controlled with saturating reactors. The capacitor-thyratron system has most flexibility of control but makes use of thyratrons which are a renewable item. The rotating-impulse generator is attractive only on large installations and here there is danger of system hunting. The saturating-reactor system constitutes a positive system which has no renewable parts. Means have been developed for either manual or automatic control.

41-124—A New Transformer for Base Load Stations; *Philip Sporn (F'30) and H. V. Putman (M'32).* 15 cents by mail. This paper describes the application of "Hipersil" to three 40,000 kva units for the Philo generating station of The Ohio Power Company. Because of "Hipersil's" ability to carry one-third more magnetic flux, appreciable savings in weight and dimensions are possible—in fact, the transformers will be shipped in oil completely assembled with bushings in place, ready to operate. Forced-oil and forced-air cooling is provided, with proper relays for protection in the event of excessive copper temperature or failure of auxiliaries. Reliability, economy, ease of installation, and low maintenance have been the objectives sought in the design.

41-118—The Basis for the Nondestructive Testing of Insulation; *R. F. Field (M'40).* 20 cents by mail. The success of the non-destructive testing of insulation depends on the existence of a satisfactory correlation between any decrease in dielectric strength caused by deterioration of any insulation and changes in the electrical characteristics of the insulation. Such correlation does exist because of the mutual dependence of dielectric strength and low-frequency interfacial polarization on the abundance and disposition of free electrons and ions throughout the material. This polarization is defined by four parameters whose values can be determined only from current-time curves because the relaxation frequency of the polarization is below the range of bridge measurements. The method of graphical analysis of these curves suggested by K. S. and R. H. Cole in a paper presented at a recent meeting of the American Physical Society, can be used for the calculation of these parameters.

41-110—Damping and Synchronizing Torque of the Double-Fed Asynchronous Machine; *M. M. Liwschitz (M'39).* 15 cents by mail. It has required more than 20 years (L. Dreyfus—1911, R. H. Park—1933) to solve the damping problem of the d-c-excited synchronous machine. In recent times the a-c-excited synchronous machine, that is, the double-fed asynchronous machine, has become important as drive with wide speed range. For speed control at least four more main machines are necessary,

two synchronous machines and two d-c machines. The total system consists of mechanical springs, electrical springs (synchronizing torques), mechanical dampings, electrical dampings, and masses. The dynamic stability of the system depends on the springs, dampings, and masses of all parts of the system. At present no work has been published about the damping and synchronizing torques of the a-c-excited synchronous machine. The object of this paper is to derive formulas for these torques. As in the case of the synchronous machine, complicated results cannot be avoided. Approximate shorter formulas are given at the end of the paper.

Electronics

41-117—Current Rating and Life of Cold-Cathode Tubes; *G. H. Rockwood (M'34).* 15 cents by mail. The life of low-voltage cold-cathode tubes is found to be determined solely by the current drawn. Tube life is terminated by the removal of the active material from the cathode surface by sputtering. The relationship between life and current drain is established on theoretical grounds and this relation checked experimentally. The application of the law relating current and life to tube ratings is discussed.

Industrial Power Applications

41-98—A New Mercury Rheostatic Element for Regulation and Control; *K. A. Oplinger (M'39).* 15 cents by mail. See May issue, page 230, for abstract incorrectly numbered there as 41-99.

41-136—A Distribution System for War-Time Plant Expansion; *J. L. McKeever (A'32).* 15 cents by mail. This paper describes the industrial distribution system recently installed in an extension to the Peterborough, Ont., plant of the Canadian General Electric Company. Use is made of the network principle but the system is thought to be unique in that it is a development of the primary network propounded by various members of the General Electric Company some ten years ago, rather than of the metropolitan type of network. Use is made of unit substations of simplified design with Pyranol-filled transformers. The 6,600-volt primaries are connected into a loop or ring main, while the 575-volt secondaries are interconnected to form a network. The network protection is extremely simple and consists merely of the inverse-time and instantaneous trips on the 575-volt network air circuit breakers at either end of the 6,600-volt loop. Advantages obtained by the use of the network system are given and a comparison is made between it and the conventional radial system as regards both function and cost.

Instruments and Measurements

41-132—The A-C Dielectric-Loss and Power-Factor Method for Field Investigation of Electrical Insulation; *Frank C. Doble (A'12).* 20 cents by mail. This paper explains in detail the shielding principles which made field testing possible, traces the

history of its development, and summarizes its application as already recorded in the literature.

41-125—Relative Accuracy of Three-Phase Metering Combinations; *C. T. Weller (M'21).* 15 cents by mail. This paper grades in terms of relative accuracy several three-phase combinations of instrument transformers and watt-hour meters under various conditions. The grades range from *A* to *E*, *A* being assigned to cases where the metering combination and the conditions of application represent the best standard practice, which ordinarily approximates the ideal. In a metering combination, this means resolvability into two or more component single-phase sections. The combinations are considered principally from the instrument-transformer standpoint. Sources of uncertainty or of error are discussed, emphasizing especially difficulties sometimes encountered with wye-connected potential transformers and the effects of various secondary interconnections on the metering accuracy. The paper is summarized in one tabulation, which conveys a general idea of the performance to be expected from the metering combinations under different conditions from the accuracy standpoint. Four figures show the schematic connections of complete metering applications and of the component parts.

41-112—The Shielding of Permanent Magnets From Transient Magnetic Fields; *George J. Wey (A'38).* 15 cents by mail. Operating experience with watt-hour meters has shown that the damping magnets on a few meters each year are weakened by the magnetic fields of lightning-surge currents which may flow in the service wiring. The paper shows how ordinary forged steel magnets may be protected from such fields by shielding with a thick copper coating applied by a new high-speed copper plating process. Curves are shown comparing the shielding effect of ordinary copper plating, Schoop sprayed copper, copper-clad magnet steel, and the new high-speed copper plating. Desirable features of this method of protection are complete interchangeability between shielded and unshielded magnets and the use of conventional materials which are easy to obtain.

41-108—An Improved Frequency Meter for Commercial Power Frequencies; *K. J. Knudsen (M'38).* 15 cents by mail. This paper describes a frequency meter in which the external reactor has been eliminated by using an iron core cross-coil dynamometer. Detailed description is given of a precision calibration method, accomplished by means of a multivibrator, an oscillograph, and a variable speed generator in conjunction with an auxiliary frequency meter, having a range of two-tenths cycle. The accuracy of the 55-65-cycles instrument is within two-tenths cycle, allowing for a voltage variation of 90 to 140 volts, a ten per cent third harmonic distortion, and ambient temperatures from minus 20 to plus 45 degrees centigrade. The dynamometer can be housed in a three-and-a-half-inch case and is well adapted for use as a six-inch instrument. It is felt that this frequency meter is of particular value where space is limited, due to its compactness and the absence of auxiliary equipment.

41-106—Effect of Sapphire Crystal Orientation on the Wear of Watt-Hour Meter Bearings; *J. H. Goss (A'35). 15 cents by mail.* This paper describes the most recent of a series of studies on the life of watt-hour-meter bearing materials. It covers an investigation of the effect of jewel crystalline axis orientation upon jewel wear. Lifetime stability of meter calibration is a function of bearing wear. A study of the wear (after several years' service) of the sapphire jewel cups of meters in relation to crystalline orientation confirms predictions of another investigator; and a corroborative theory, based upon the physics of crystals, is presented.

41-119—Power Circuit Instruments for the Higher Range of Audio-Frequencies; *L. J. Lunas (M'36) and Paul MacGahan (M'15). 15 cents by mail.* The extending use being made of frequencies from 900 to 12,000 for special purposes such as induction furnaces, introduces new problems in instrument design and calibration. Previous practical a-c instruments were either of the electrodynamic or moving-iron types designed for low power frequencies or thermal and rectifier types for audio- and radio-frequencies, these latter usually being confined to measurements of only current and voltage. The ordinary low-frequency electromagnetic instruments have such high coil reactance and losses that they are unsuitable for the higher power frequencies in question without special arrangements, which are described in the paper. Furthermore, the usual calibration methods and standards as previously used for low frequencies are not adequate, and therefore new methods of calibration were introduced.

41-120—Bushing Tests; *A. L. Brownlee (A'25) and W. H. Wickham (A'41). 15 cents by mail.* This paper gives the results of power-factor tests on high-voltage bushings at test voltages up to or above the operating voltage. The results show the desirability of testing at these higher voltages. The paper also describes the findings of laboratory examinations of deteriorated bushings from which considerable information has been obtained concerning bushing deterioration.

Land Transportation

41-104—Modern Motors Serve City Transit Systems; *W. J. Clardy (M'39) and C. A. Atwell (A'41). 15 cents by mail.* City transit motors operated today include many new mechanical and electrical features. Modern vehicles differ greatly from those of a decade ago and propulsion motors contributed substantially to the advances achieved. Meeting present-day needs has required designs for 300 and 600 volts involving extensive use of new materials, application to new types of drive, and suitability for dynamic braking. Mechanical design includes unusual developments in frame construction, method of mounting, lead arrangement, ventilation, housings, and bearings. Compactness has led to ingenuity in brushholder arrangement to secure accessibility. Armatures require judicious selection of materials for shafts, cores, and commutators, as

well as special seasoning and balancing procedure. Electrical design betterments have been introduced in armature slots, armature coils, field coils, and insulation. Provision for quietness and good commutation are also salient points. The new designs have resulted in high electrical and weight efficiency for series motors used on Diesel-electric buses, trolley coaches, and street cars, in comparison with old type machines. Excellent commutation has produced outstanding stability at rapid accelerating and dynamic braking rates. Vehicle performance is exceptional with respect to safety, operating efficiency, available selection of accelerating and braking rates, and the broad speed-range of the dynamic brake.

Power Transmission and Distribution

41-131—Impulse Strength as a Measure of Cable Quality; *L. I. Komives (A'41). 20 cents by mail.* The results of impulse tests on impregnated-paper insulated cables seem to indicate that, in a cable having the best obtainable insulation, breakdown occurs at a voltage for which the maximum stress is around 3,300 volts per mil. If the quality of the insulation is inferior, owing either to nonuniformity of taping or incomplete impregnation, the maximum stress value becomes less than 3,300 volts per mil and, therefore, the maximum stress obtained from impulse tests is a good measure of the uniformity of taping and the degree of impregnation. Solid, oil-filled, oilostatic, and compression cables, when new, all should have the same maximum stress at breakdown. For a given insulation thickness, the oil-filled cable, having the largest conductor diameter, will withstand the highest voltage even after aging. Oilostatic and compression cables also are expected to retain their original breakdown values after aging. Because of the decrease of the degree of impregnation in service, aged solid cables have a lower impulse strength than new ones and therefore, taping, being independent of age, is more important than the degree of impregnation. Low gas pressure cables, although originally lower than solid-type cables, in regard to impulse strength, are expected to retain this value after aging.

Production and Application of Light

41-123—The Incandescent Lamp Situation From the Engineering Point of View; *Preston S. Millar (M'13). 25 cents by mail.* At the height of its career, the incandescent electric lamp occupies a place of large importance in which its numerous good qualities contribute to its usefulness. Lamp engineering seeks high efficiency and low cost of light production with consistency of lamp performance and simplicity of application. It grapples with numerous problems and makes selection between possible alternative procedures. Its criterion is satisfaction of the public in lighting matters. Data are presented to show qualities of lamps and aspects of performance with which lamp engineering procedure has to do. Attainments of the lamp industry are reviewed. Benefits of large-scale industry leadership are asserted. Achievements and the relative standing of the American lamp industry are discussed.

Protective Devices

41-137—Field Investigations of Lightning; *C. F. Wagner (F'40), G. D. McCann (A'38), and Edward Beck (M'35). 25 cents by mail.* See May issue, page 231, for abstract incorrectly numbered there as 41-100.

41-133—The Protection of Solid Insulation by Lightning Arresters; *D. D. MacCarthy (A'28) and T. J. Carpenter (A'38). 15 cents by mail.* An investigation has been made to determine the impulse failure voltage of oil-immersed paper insulation samples made from materials used in distribution transformers. Previous investigations had largely dealt with high-voltage insulation and 1.5×40 microsecond full waves or chopped waves, rather than with the wave shapes resulting from the operation of lightning protective devices. In the present investigation volt-time puncture curves were obtained from tests on the wave front that show the puncture voltage as a function of time for different thicknesses of insulation. These curves were found to be relatively flat. In part of these tests, the magnitude and wave shape of the voltage applied to the insulation was controlled by lightning arresters or protective gaps in parallel with the insulation. The effect of repeated shots was also investigated. Voltages in excess of approximately 70 per cent of the single shot failure voltage damaged the insulation.

41-134—Dielectric Strength of Oil for High-Potential Testing of Oil Circuit Breakers; *H. J. Lingal (A'33), W. F. Skeats (M'36), and H. D. Braley (A'18). 15 cents by mail.* This paper reports the results of work done by an AIEE working group assigned to determine the minimum dielectric strength of oil for high potential testing of oil circuit breakers. Data from many tests, both 60-cycle and impulse, are collected, tabulated, and analyzed. The data cover tests on both new oil and used oils and the results are used in drawing the conclusions and recommendations offered by the authors. The paper shows that the dielectric strength of oil circuit breakers does not vary in direct proportion to the strength of oil as measured in a test cup. Recommendations are made as to the dielectric strength of oil to be used for circuit breaker testing.

41-135—New Current Transformer for Bus Differential Protection; *L. F. Kennedy (M'39) and A. T. Sinks (A'36). 30 cents by mail.* During the past five years many studies have been made of means for providing reliable bus differential protection. Practically all of these studies have resulted in proposed methods of bus protection capable of overcoming current transformer errors. This paper describes a new current transformer developed particularly for application where high speed differential protection is required. Current transformers designed with an air gap in the core are shown to be capable of maintaining an essentially constant ratio even with the high primary currents flowing into near-by external faults. With the possible error current due to current transformer differences reduced to a small percentage of the total current a reliable simple relay system is capable of distinguishing easily between internal and external faults. These air-gap

core transformers are shown to be much smaller than conventional designs for the same performance.

41-128—Protection of Low-Voltage Circuits by Air Circuit Breakers in Cascade Arrangement; A. E. Anderson (F'40) and C. H. Black. 25 cents by mail. This paper outlines a new solution to the problem of providing adequate short-circuit protection for low-voltage circuits operating at 600 volts or less. There are many instances where a relatively large number of main feeder circuits supply an even larger number of branch feeders. The selection of branch feeder breakers, or possibly even main feeder breakers, with interrupting ratings high enough to match the obtainable short-circuit currents may prove completely impractical when viewed with any reasonable regard for space requirements or cost. The paper describes a practical and economical solution to this problem. Air circuit breakers of varying interrupting ratings but properly coordinated designs are used in a "cascade" or series connection in such manner that in event of a severe fault, the main breakers "back up" the smaller main feeder breakers, and these in turn "back up" the branch feeder breakers.

41-115—Lightning to the Empire State Building—II; K. B. McEachron (F'37). 20 cents by mail. Since 1935 the author has been trying to secure oscillographic records of the wave shapes of natural lightning to the Empire State Building. The first low-speed oscillogram showing changes in current during one second was obtained in 1937. Four usable high-speed oscillograms of current peaks were obtained in 1938, including 12 oscillograms showing 12 peaks occurring in 0.28 second. During the summer of 1940, 17 strokes were recorded on the low-speed oscillograph and correlating data were obtained for most strokes on the high-speed oscillograph. Forty-one current peaks so recorded make possible the determination of the frequency of occurrence of various rates of rise, crest currents, duration, and charge. One stroke having a positive crest current of 58,000 amperes was recorded. The application of these data to transmission lines is briefly discussed.

41-116—Power Circuit Breaker Ratings; R. C. Van Sickle (M'37). 15 cents by mail. Circuit-breaker application is being simplified. An important step in this movement is the establishment of the various elements of a breaker rating in such relation to one another that the choosing of a breaker of adequate interrupting capacity automatically selects a breaker capable of meeting the other related requirements. A new proposal for the calculation of the interrupting current eliminates the variable of the tripping time of the circuit breaker. This paper shows that with the standardizing of the tripping time, the rated making current, rated momentary current, rated five-second current and rated interrupting capacity can be related to simplify further the breaker application.

41-114—Mechanical Simplicity of Air-Blast Circuit Breakers; H. W. Haberl (A'28) and Otto Jensen. 15 cents by mail. This pa-

per deals with the mechanism of air-blast breakers. Included is a general description of breakers with voltage ranges from 4 to 230 kv followed by a detailed description of some of the mechanism common to all types. Three distinct types of breakers are followed through a sequence operation and schematic diagrams are included to clarify the mechanical details. Included in the diagrams are photographs of the actual breaker being described, also a sequence oscillogram and a staged interruption test. A fourth type of breaker is described, but schematic diagrams of this type are not included as they are similar to one of the previous types.

41-122—D-C Machine Flashover and Bus Short Circuit Protection; T. B. Montgomery (M'41) and J. F. Sellers (A'34). 25 cents by mail. In protecting d-c bus systems recognized tripping methods which have been generally accepted are reviewed. Two methods of bus construction for large d-c steel-mill applications having large concentration of power, and reasons for their justification are presented. Bus construction of two typical large hot-strip mill applications are described. Test oscillograms and characteristic test curves for both heavy and nominal short-circuit interruptions are given for air circuit breakers protecting these systems in the conventional manner. D-c machine characteristics are developed under short-circuit conditions and formulas and short-circuit current curves are presented. A novel protective relay system which has proved successful in practice is described, and the improved protection indicated by tripping current and time values are shown in curve form.

41-121—System Short-Circuit Currents—Proposed New Calculating Procedure for Application of Interrupting Devices and Relays; W. M. Hanna (A'26), H. A. Travers (A'41), C. F. Wagner (F'40); C. A. Woodrow (M'41) and W. F. Skeats (M'36). 20 cents by mail. This paper is the report of a group assigned to investigate the problem under the auspices of the subcommittee on circuit breakers, switches, and fuses of the AIEE protective devices committee. The method proposed consists of the determination of the highest value of symmetrical short-circuit current for any type of fault as obtained by dividing voltage by subtransient reactance. Multiplying factors are then assigned according to the basis of rating of the equipment concerned and the speed of its operation. This procedure is more realistic in its appraisal of the contribution of the d-c component than the present decrement curves and with the increase in complexity of systems over recent years and the present wide and increasing use of high-speed relaying offers other advantages, both in simplicity of application and accuracy.

Personal • •

A. J. Duncan (A'09) formerly president of the Texas Electric Service Company, Fort Worth, has been made chairman of the board of directors. **J. B. Thomas (M'28)** formerly vice-president and general manager of the company, has been appointed

president and general manager. Mr. Duncan was born in 1877 at Pittsburgh, Pa. After having been employed for several years by the Cleveland Electric Illuminating Company, the Brush Electric Company, and the General Electric Company, he became lighting engineer for the Interborough Rapid Transit Company, New York. He was with that company for five years and about 1906 was made secretary and general manager of the Citizens' Railway and Lighting Company of Fort Worth. About 1915 he became president of the Fort Worth Power and Light Company, and in 1932 was made president of the Texas Electric Service Company. Mr. Thomas was born July 19, 1891, in San Marcos, Texas, and received the degree of bachelor of science in mechanical engineering from Texas Agricultural and Mechanical College in 1911. In 1912 he became a draftsman and engineer for the Texas Power and Light Company, and in 1916 was made resident engineer in charge of construction. From 1916 to 1917 he was office engineer for that company. From 1917 to 1919 he served in the United States Army Coast Artillery Corps, and returned to the Texas Power and Light Company as resident engineer and later as assistant to the chief engineer. From 1921 to 1929 he was chief engineer for the company and in 1930 became vice-president in charge of operations for the Texas Electric Service Company, later occupying the positions of executive vice-president and general manager. He has been active on several Institute committees, and is also a member of The American Society of Mechanical Engineers.

A. P. M. Fleming (M'14, F'34) director of research and education, Metropolitan-Vickers Electrical Company, Ltd., Manchester, England, and local honorary secretary of the Institute for Great Britain, has been awarded the Faraday Medal for 1940 by the Council of the Institution of Electrical Engineers (Great Britain). Doctor Fleming was born January 16th, 1881, at Newport, Isle-of-Wight, and received the degree of master of science from Finsbury Technical College, London, in 1898. In 1898 he became assistant engineer of the London Electric Supply Corporation, and later carried on experimental testing for Elliott Brothers, electrical instrument makers. From 1900 to 1902 he was with the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., and from 1902 to 1905 was insulation specialist for the British Westinghouse Electric and Manufacturing Company, Ltd., Manchester, England, which subsequently became Metropolitan-Vickers Electrical Company, Ltd. In 1905 he became transformer designer for the company, and in 1908 assistant superintendent in charge of manufacture and design of transformers. He was made superintendent of the transformer, winding and insulating department in 1911 and became director of research and education in 1914. In 1915 he was sent to the United States by the British government to make an investigation of American institutions organized to conduct industrial research. Doctor Fleming is the author of several books and of many technical articles, and holds the honorary degrees of master of science, Manchester, and doctor

of engineering, Liverpool. He is a past president of the Institution of Electrical Engineers, and is a fellow of the Institute of Patentees and a member of the Institution of Mechanical Engineers.

F. D. Knight (M'25) formerly superintendent of production for the Boston Edison Company, Boston, Mass., has become assistant to the operating vice-president of the Hartford (Conn.) Electric Light Company. **H. W. H. Wellington** (A'38) formerly assistant superintendent of production, will succeed Mr. Knight as superintendent of production for the Boston company. Mr. Knight was born in Limerick, Maine, October 27, 1883, and received the degree of bachelor of science in electrical engineering from the University of Maine in 1909. From 1909 to 1925 he was superintendent in charge of construction for projects undertaken by the Stone and Webster Company of Boston, Mass., in Fort Worth, Tex., Baton Rouge, La., Boston, Mass., Springfield, Mass., and Hartford, Conn. In 1925 he became superintendent of the generating department, Edison Electric Illuminating Company of Boston (now Boston Edison). He is also a member of The American Society of Mechanical Engineers. Mr. Wellington was born June 23, 1890 in Boston, Mass. In 1911 he became associated with the General Electric Company, at Lynn, Mass., and worked in several departments before joining the Stone and Webster Company, Boston, Mass., as a construction wireman. He later worked as a draftsman for the Boston Elevated Company and was also with the Edison Electric Illuminating Company of Boston in the technical division for a short time. After working with the American Car Works of St. Louis, Mo., and the Union Electric Light and Power Company of St. Louis he joined the Edison Electric Illuminating Company of Boston in 1921 as electrical technical engineer. In 1924 he became assistant to the superintendent of the production department, and in 1937 was made assistant superintendent of production.

Wilfred Sykes (A'09, F'14) formerly assistant to the president of the Inland Steel Company, Chicago, Ill., has been elected president of the company. Mr. Sykes was born in Palmerston, North New Zealand, December 8, 1879, and attended the University of Melbourne. From 1900 to 1905 he was employed by D. Durcks and Company (afterwards Knox-Schlapp and Company), Australian agents for Allegemeine Elektricitats Gesellschaft of Berlin, Germany. He was assistant to the chief engineer, manager of the Sidney branch, and later chief electrical engineer for the concern in Melbourne. When the Allegemeine Elektricitats Gesellschaft agency was transferred to Staerker and Fischer he took charge of electrical work in Victoria, Tasmania, and South Australia, and in 1906 went to Berlin as engineer in the foreign department of the Berlin company. In 1909 he came to the United States and was employed as engineer by the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. In 1921 he became affiliated with the Steel and Tube Company of America, Chicago, Ill., and in 1923

joined the staff of the Inland Steel Company. He was a manager of the Institute from 1917 to 1921, and has been active on several Institute committees. He is also a member of The American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers, and is the author of several technical papers.

W. F. Grimes (A'19, M'27) radio material officer of the 11th Naval District, San Diego, Calif., has been promoted to the rank of lieutenant-commander in the United States Naval Reserve. Mr. Grimes was born in Pasadena, Calif., February 21, 1895, and studied electrical engineering at the University of Southern California. From 1917 to 1918 he was with the staff commander-in-chief of the United States fleet, working on maintenance of communication equipment. In 1918 he became assistant in the Naval Radio Research Laboratory at the Bureau of Standards, Washington, D. C. From 1919 to 1924 he was expert on radio for the bureau of engineering, Navy Department, Washington, D. C. In 1925 he joined the Westinghouse Electric and Manufacturing Company, and did sales and engineering work for the Los Angeles, Calif., office. From 1931 to about 1936 he was engaged as radio interference engineer for various Los Angeles trade associations, and in 1936 became chief engineer (later manager) of the Radio Interference Engineering Bureau of Los Angeles. During 1941 he has been serving as radio material officer in the United States Naval Reserve. He is the author of numerous technical publications.

C. E. Brown, Jr. (A'40) formerly assistant to the president of the Okonite Company and the Okonite-Callender Cable Company, Washington, D. C., has been elected vice-president of the companies. He will also remain in charge of the Washington, D. C., office. Mr. Brown was born August 2, 1894 in Buffalo, N. Y., and received the degree of bachelor of arts from Princeton University in 1917. From 1919 to 1925 he was with the Central Electric Company, Chicago, Ill., and during 1925 was country sales manager in charge of sales in about 19 states outside Illinois. In 1925 he became affiliated with the Okonite Company, as manager of the power and light department in the Chicago area. In 1930 he was transferred to the executive offices of the company in New York, and became executive assistant to the president. Since 1934, in addition to retaining the latter position he has been sales executive for the company in Washington, D. C. He is also a member of the American Society of Naval Engineers.

W. H. Pratt (A'02, F'13) retired consulting engineer of the meter division of the General Electric Company, Lynn, Mass., has been chosen as the first recipient of the New England Award newly established by the Engineering Societies of New England, Inc. Mr. Pratt was born December 29, 1872, at Waltham, Mass. He received the degree of bachelor of science in electrical engineering from the Massachusetts In-

stitute of Technology in 1894, and shortly afterward was employed by the Judson L. Thompson Manufacturing Company of Waltham, Mass., as a draftsman. In June 1895 he entered the testing department of the General Electric Company, at Lynn, Mass., and in November of the same year was appointed foreman in charge of the standardizing laboratory. In 1897 he became assistant in meter and instrument design in the engineering department of the company, and later was made designing engineer in charge of meter and instrument design. He is the owner of several patents.

F. B. Jewett (A'03, F'12) president of the National Academy of Sciences is a member of the board of the newly created National Science Fund of the National Academy of Sciences (see page 308). Doctor Jewett who is a vice-president of the American Telephone and Telegraph Company, New York, N. Y. and chairman of the board of directors of the Bell Telephone Laboratories, is serving as a member of the National Defense Research Committee. Other Institute members who will serve on the board of the National Science Fund are **K. T. Compton** (F'31) president of the Massachusetts Institute of Technology, Cambridge; **Gano Dunn** (A'91, F'12) president of the J. G. White Engineering Corporation, New York, N. Y., and chairman of the advisory power committee organized by the National Defense Advisory Commission; and **R. A. Millikan** (M'22) director of the Norman Bridge Laboratory of Physics and chairman of the executive council of California Institute of Technology, Pasadena.

J. B. Noe (A'03, F'30) assistant to the planning engineer of the Consolidated Edison Company of New York, Inc., New York, N. Y., retired recently after 43 years with the company. He was born in Elizabeth, N. J., March 27, 1876, and received the degree of bachelor of science from Rutgers University in 1897. From 1897 to 1901 he was employed as a meter tester by the Edison Electric Illuminating Company (now the Consolidated Edison Company of New York, Inc.), and for a year was also electrical engineer of the Consolidated Telegraph and Electrical Subway Company. In 1902 he became assistant to the superintendent of transmission and distribution of the Consolidated Edison Company, and in 1910 was made assistant to the chief electrical engineer. He became assistant engineer of the electrical engineering department in 1925. He is also a member of the American Standards Association.

H. L. Hazeltine (A'20, F'40) engineer of insulation for the Sterling Varnish Company, Haysville, Pa., has been elected vice-president of the company. Mr. Hazeltine was born May 26, 1891, at Miller Place, N. Y. He received the degree of bachelor of philosophy from Yale University in 1913, and from 1913 to 1915 was assistant instructor in physics in the Sheffield Scientific School of Yale University. After a year as foreman for the White Adding Machine Company, New Haven, Conn., he became instructor in physics at the Georgia School

of Technology, Atlanta, in 1916. In 1917 he became head of the department of electricity of the School of Industrial Arts, Trenton, N. J., and in 1920 became affiliated with the Sterling Varnish Company, as eastern manager. From 1923 to the present he has been engineer of insulation for that company. He is also a member of the American Society for Testing Materials.

F. S. Bacon, Jr. (A'37) formerly sales engineer for the central station division of the Westinghouse Electric and Manufacturing Company at Boston, Mass., has been appointed assistant central station manager, New England district. **F. R. Benedict** (A'40) has been made engineering manager for the New England district, and **L. O. Dorfman** (A'19, M'28) formerly engineering manager for the New England district has been appointed assistant to the district engineering manager at East Pittsburgh, Pa. **C. F. Herbold** (A'33) formerly engineer of the small motors division, is now manager of industrial relations for the small motors division. **S. C. Leyland** (A'40), who was relay application engineer for the company, has been made relay section engineer for the meter division, and **R. M. Smith** (A'35) formerly section engineer, is now manager of the engineering department of the wiring device division.

C. J. Grece (A'22) assistant general foreman in the underground division of the Consolidated Edison Company of New York, Inc., New York, N. Y., has retired, having been with the company for 40 years. Mr. Grece was born in Jersey City, N. J., September 5, 1884. He joined the Consolidated Edison Company in 1900, and has served since as underground helper, tester, foreman, and assistant general foreman.

C. I. MacGuffie (A'27) has been appointed manager of sales, electric welding section, industrial department, General Electric Company, Schenectady, N. Y. He was formerly assistant manager.

R. C. Glancy (A'18, M'26) formerly operating results engineer, has been appointed general staff engineer, Bell Telephone Company of Pennsylvania, Philadelphia, Pa.

Ill. from 1910 to 1916. In 1917 he returned to the Bureau of Standards as associate electrical engineer. He was the author of several technical articles and of many of the technical publications of the Bureau of Standards. In 1910 he received the Edward Longstreth Medal of the Franklin Institute. He was president of the International Association of Electrical Inspectors, past president of the American Society of Safety Engineers, and was also a member of the United States National Committee of the International Commission on Illumination, the National Fire Protection Association, the National Safety Council, and the American Standards Association. He served on the Institute committee on safety and was a past chairman of the Washington Section.

William Shirley Richhart (A'08, M'13) superintendent of power production at the Spy Run generating plant of the Indiana Service Corporation, Fort Wayne, Ind., died April 9, 1941. He was born September 26, 1881, in Noblesville, Ind. and received the degree of bachelor of science in electrical engineering from Purdue University in 1905. After having been employed by the Allis-Chalmers Manufacturing Company, Cincinnati, Ohio, for a short time, he did research work at Purdue University, Lafayette, Ind., and in 1906 became an instructor in electrical engineering at the University of Pennsylvania, Philadelphia. From 1911 to 1916 he was with the Westinghouse Electric and Manufacturing Company as an engineer in the service department, and in 1916 became affiliated with the Public Service Commission of Indiana, Indianapolis. In 1917 he joined the Indiana Service Corporation as an electrical engineer in the light and power department. He subsequently served as assistant operating engineer, power operating engineer, electrical distribution engineer and power production engineer. From 1935 to 1938 he was sent on leave of absence to do special engineering work in Indianapolis and New York. He was also a member of The American Society of Mechanical Engineers.

Roscoe Schaeffer (A'32, M'36) superintendent of engineering for the Oklahoma Gas and Electric Company, Oklahoma City, Okla., died April 18, 1941. He was born April 10, 1892, at Ludlow, Illinois, and received the degree of bachelor of science in electrical engineering from Iowa State College in 1915. From 1915 to 1916 he was assistant superintendent of a municipal steam-electric power plant at Buffalo Center, Iowa, after which he became associated with the General Electric Company, Schenectady, N. Y., doing work in the testing department, and in 1919 was made assistant to the general foreman of the General Electric testing department. From 1919 to 1923 he did electrical engineering work with the Remy Electric Company, Anderson, Ind., and with the William A. Baehr organization, Chicago, Ill. In 1923 he joined the Oklahoma Gas and Electric Company, Oklahoma City, as assistant to the construction superintendent and later became assistant to the general superintendent of operation. In 1926 he was employed by the Byllesby Engineering and Management

Corporation of Chicago, Ill., continuing as resident electrical engineer on property of the Oklahoma Gas and Electric Company at Oklahoma City. In 1936 he was re-employed by the latter company as superintendent of engineering. He was vice-chairman of the AIEE Oklahoma City Section.

Reuben E. Nyswander (M'22) dean, school of science and engineering, University of Denver, Denver, Colo., died April 8, 1941. He was born January 4, 1878, in Antwerp, Ohio, and received the degrees of bachelor of arts, 1901, and master of arts, 1904, from Indiana University, and the degree of doctor of philosophy from Cornell University in 1908. From 1898 to 1903 he was an assistant in physics at Indiana University, Bloomington, and 1903-06 magnetic observer for the United States Coast and Geodetic Survey. He became an instructor in physics at Indiana University in 1908. After a year there he accepted a position as professor of physics at the University of Denver. In 1919 he was made director of the school of electrical engineering, and when it was reorganized into a combined school of science and engineering he became associate dean of the department. He was made dean of the school in 1937. Dean Nyswander was the author of several technical articles, and had invented a polarization photometer. He was chairman of the AIEE Denver Section, 1931-32.

Andrew Patterson (A'08, M'38) chief engineer of the Southwestern Gas and Electric Company, Shreveport, La., died April 4, 1941. He was born June 6, 1881, in Baltimore, Md., and was educated at Baltimore Polytechnic Institute. From 1903 to 1905 he was engaged in plant and distribution system redesign and reconstruction for H. M. Byllesby and Company, Chicago, Ill., and for the Oklahoma Gas and Electric Company, Oklahoma City. In 1905 he was electrical engineer in plant layout for the Muskogee Gas and Electric Company, and electric superintendent of layout construction sponsored by H. M. Byllesby and Company at Fort Smith, Ark. In 1914 he became engineer on electric plant construction for the Dawes Electric Company, later the Southwestern Gas and Electric Company, and was also electric superintendent, a position which he held until he was appointed chief engineer for the company in 1926.

Frederick John Cunningham (A'19) superintendent of communications, Consumers Power Company of Michigan, Battle Creek, died in April 1941. He was born February 28, 1886, in Saginaw, Mich. In 1911 he was employed by the Au Sable Electric Company, in constructing and operating a 140,000-volt line between Five Channels Dam and Flint, Mich. From 1912 to 1915 he was load dispatcher for the Au Sable Company at Saginaw, Mich., and in 1915 took charge of the eastern division of Consumers Power Company, which was formerly the Au Sable Company. After a year as division superintendent there, he was transferred to division superintendent of the southern division of the Consumers Power Company, at Battle Creek, a position which he held until his death.

Obituary • • •

Morton Githens Lloyd (A'08, M'10, F'12) chief of the safety codes section at the National Bureau of Standards, Washington, D. C., died April 26, 1941. He was born September 10, 1874, in Beverley, N. J. He received the degrees of bachelor of science, 1896, doctor of philosophy, 1900, and electrical engineer, 1908, from the University of Pennsylvania. He also studied at Harvard University and the Friedrich Wilhelms Universität, Berlin. From 1899 to 1902 he was an instructor in physics at the University of Pennsylvania, and in 1902 became associated with the Bureau of Standards, where he served first as laboratory assistant and later as assistant physicist and associate physicist. He was technical editor of the *Electrical Review and Western Electrician*, Chicago,

Membership • •

Recommended for Transfer

The board of examiners, at its meeting on May 22, 1941, recommended the following members for transfer to the grade of membership indicated. Any objection to these transfers should be filed at once with the national secretary.

To Grade of Member

Adams, L. J., electrical engineer, Warner Brothers Pictures, Inc., Burbank, Calif.
 Baker, B. P., development engineer, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
 Bohm, D. I., electrical engineer, Aluminum Company of America, Pittsburgh, Pa.
 Drake, D. K., assistant Montana transmission and protection engineer, Helena, Mont.
 de la Serna, R. T., chief engineer, Cia de Electricidad del Sud Argentino, S. A., Buenos Aires, Argentina.
 Deming, P. S., engineer, Oklahoma Gas and Electric Company, Enid.
 Dickinson, R. C., section engineer, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
 Diehl, R. P., electrical engineer, Park City Consolidated Mines Company, Park City, Utah.
 Duff, C. K., meter engineer, Hydroelectric Power Commission, Toronto, Ont., Can.
 Fleming, H. C., member of laboratory staff, Bell Telephone Laboratories Inc., New York.
 Hagen, A. C., engineer, Rural Electrification Administration, Washington, D. C.
 Hellwarth, A. R., electric system, Detroit Edison Company, Detroit, Mich.
 Hill, A. W., design engineer, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
 Horelick, S., president, Pennsylvania Transformer Company, Pittsburgh, Pa.
 Hough, W. R., engineer in charge of a-c motor design, Reliance Electric and Engineering Company, Cleveland, Ohio.
 Hummel, R. C., technical adviser, West Coast Telephone Company, Everett, Wash.
 Jochem, T. B., experimental engineer, Cutler-Hammer, Inc., Milwaukee, Wis.
 John, K. W., electrical engineer, United States Rubber Company, Detroit, Mich.
 Lallier, W. C., transmission engineer, Wisconsin Telephone Company, Milwaukee, Wis.
 Lockwood, L. E., assistant to division operating superintendent, Public Service Company, Evanston, Ill.
 Marsh, H. H., assistant general superintendent Duquesne Light Company, Pittsburgh, Pa.
 McClure, E. L., assistant system engineer, Wisconsin Electric Power Company, Milwaukee, Wis.
 Miner, E. E., construction electrical engineer, The Glenn L. Martin Company, Baltimore, Md.
 Parker, C. N., engineer, The Nevada-California Electric Corporation, Riverside, Calif.
 Pell, Eric, electrical engineer, Cutler-Hammer, Inc., Milwaukee, Wis.
 Rawlins, H. L., section engineer, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
 Robinson, T. A., electrical engineer, United States Smelting Refining and Mining Co., Salt Lake City, Utah.
 Roby, F. H., welding engineer, Square D Company, Milwaukee, Wis.
 Roush, C. G., manager, Westinghouse Electric and Manufacturing Company, Kansas City, Mo.
 Salton, H. D., development engineer, Pennsylvania Transformer Company, Pittsburgh, Pa.
 Saxe, John, manager, electric utility companies in Costa Rica, Costa Rica.
 Sessions, R. C., partner, Sessions and Sessions, Cleveland, Ohio.
 Stettler, F. E., district foreign wire relations supervisor, Wisconsin Telephone Company, Milwaukee, Wis.
 Sullivan, R. J., electrical engineer, Commonwealth and Southern Corporation, Jackson, Mich.
 Witzel, E. R., electrical engineer, Kohler Company, Kohler, Wis.
 35 to grade of Member

Applications for Election

Applications have been received at headquarters from the following candidates for election to membership in the Institute. Names of applicants in the United States and Canada are arranged by geographical Districts. If the applicant has applied for direct admission to a grade higher than Associate, the grade follows immediately after the name. Any member objecting to the election of any of these candidates should so inform the national secretary before June 30, 1941, or August 31, 1941 if the applicant resides outside of the United States or Canada.

United States and Canada

1. NORTH EASTERN
 Blomstedt, H. D., Narragansett Electric Company, Providence, R. I.

Campbell, H. E., General Electric Company, Schenectady, N. Y.
 Fjeld, J. M., New York Power and Light Corporation, Albany, New York.
 Franklin, I. L., General Electric Company, Schenectady, N. Y.
 Gronbeck, J. W., Narragansett Electric Company, Providence, R. I.
 Haner, L. P., E. I. du Pont de Nemours and Company, Incorporated, Station B, Buffalo, N. Y.
 Hogg, J. E., General Electric Company, Schenectady, N. Y.
 Hoyt, G. A., General Electric Company, Schenectady, New York.
 Kidder, J. W. (Member re-election), New England Telephone and Telegraph Company, Boston, Mass.
 Merkling, W. G., Central New York Power Corporation, Oswego, N. Y.
 Schaefer, F. J., Wm. H. J. Hooper, Boston, Mass.
 Shappee, F. C., Central New York Power Corporation, Minetto, N. Y.
 Smith, W. M., F. W. Sickles Company, Chicopee, Massachusetts.

2. MIDDLE EASTERN

Ali, N. J., 125 Hough Street, Morgantown, W. Va.
 Bergeron, P., Cleveland Electric Illuminating Company, Cleveland, Ohio.
 Boisseau, A. C., General Electric Company, Philadelphia, Pa.
 Byrne, J. F., Bell Telephone Company of Pennsylvania, Pittsburgh, Pa.
 Chase, M., Rural Electrification Administration, Washington, D. C.
 Delaheoke, H. R., North Electric Manufacturing Company, Galion, Ohio.
 Finn, E. B., Insulation Manufacturers Corporation, Cleveland, Ohio.
 Gieser, L. B., Potomac Electric Power Company, Washington, D. C.
 Gillenwater, G. A., Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
 Green, C. R., Austin Company, Cleveland, Ohio.
 Hamilton, H. L., I-T-E Circuit Breaker Company, Philadelphia, Pa.
 Havercamp, W. B., WGAL, Incorporated, Lancaster, Pa.
 Heiges, G. E. (Member), Heiges McCullough Company, Incorporated, Sharon, Pa.
 Hufford, D. W. (Member), War Department Corps of Engineers, U. S. Engineer Office, Huntington, W. Va.

Jensen, O., I-T-E Circuit Breaker Company, Philadelphia, Pa.
 Kerr, M. P. (Member), Wheeling Electric Company, Wheeling, West Va.
 Kuhn, H. R., Trumbull Electric Manufacturing Company, Norwood, Ohio.
 Link, E. O., North Electric Manufacturing Company, Galion, Ohio.
 Ludwig, C. H., Potomac Electric Power Company, Washington, D. C.
 Mack, R., Cleveland Electric Illuminating Company, Cleveland, Ohio.
 Marsh, C. O., Jr., National Bureau of Standards, Washington, D. C.
 McLain, I. C. (Member), Rural Electrification Administration, Washington, D. C.

Mikina, S. J. (Member), Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
 Moldenhauer, E. W., Rural Electrification Administration, Washington, D. C.
 Oeltjen, W. O., Rural Electrification Administration, Washington, D. C.

Polson, J. T., Cleveland Electric Illuminating Company, Cleveland, Ohio.
 Prasek, C. J., Cleveland Electric Illuminating Company, Ashtabula, Ohio.
 Shangraw, R. L. (Member), Rural Electrification Administration, Washington, D. C.

Simpson, W. E., Potomac Electric Power Company, Washington, D. C.
 Sparling, W. H., Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.
 Talley, D. (Member), c/o Chief Signal Officer, Munitions Bldg., Washington, D. C.

Vergilio, J. L., 504 Erie Building, Cleveland, Ohio.
 Vlach, C. J., Cleveland Electric Illuminating Company, Cleveland, Ohio.

Whalin, C. V., Jr., Potomac Electric Power Company, Washington, D. C.
 Wildman, J. R., Hickok Electrical Instrument Company, Cleveland, Ohio.
 Wilent, G. W., Atlantic Refining Company, Philadelphia, Pa.

Woods, T. B., Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

3. NEW YORK CITY

Ellis, W. F., Gibbs and Cox, Incorporated, New York, N. Y.
 Engel, G. C., General Time Instruments Corporation, New York, N. Y.
 Francis, W. R., Western Union Telegraph Company, New York, New York.
 Knapp, M. H., Simplex Wire and Cable Company, New York, N. Y.
 Lake, F. J., Consolidated Edison Company of New York Incorporated, New York, N. Y.
 Lawrence, J. G. (Member), Caribbean Architect-Engineer, New York, N. Y.
 O'Meara, T. J., Manhattan College, New York, N. Y.
 Seely, T., Public Service Electric and Gas Company, Newark, N. J.

Tyrner, J. M., Wilson Welder and Metals Company, Incorporated, New York, N. Y.
 Zinn, M. K. (Member), Bell Telephone Laboratories, Incorporated, New York, N. Y.

4. SOUTHERN

Amerine, H. G., Jr., Tennessee Valley Authority, Knoxville, Tennessee.
 Boysworth, J. T., Carolina Aluminum Company, Badin, N. C.
 Cecil, H. G. (Member), 505 Cumberland Street, Bristol, Va.
 Cooper, W. R., Tennessee Valley Authority, Chattanooga, Tenn.
 Fort, W. G. S., United States Army, 62nd Signal Battalion, Fort McPherson, Ga.
 Johnson, W. M., Florida Power and Light Company, Miami, Florida.
 Owens, J. R., Memphis Light, Gas and Water Division, Memphis, Tenn.
 Sigmon, R. M., Jr., Southern Bell Telephone and Telegraph Company, Columbia, S. C.
 Smith, C. D. (Member), South Carolina Power Company, Charleston, S. C.
 Watkins, W. W. (Member), United States Rubber Company, Hogansville, Ga.

5. GREAT LAKES

Anger, E. G., Square D Company, Milwaukee, Wisconsin.
 Baring, J. W. (Member), Commonwealth Edison Company, Chicago, Ill.
 Barnum, W. L., Waterlyet Paper Company, Waterlyet, Michigan.
 Callstrom, B. M., Jr., Southwestern Illinois Coal Corporation, Steelville, Illinois.
 Carlson, A. E., Dumore Manufacturing Company Racine, Wisconsin.
 Davis, R. S., Bull Dog Electric Products Company, Detroit, Michigan.
 Hornbacker, G. B., Central Illinois Light Company, Peoria, Ill.
 Jensen, H. A., Nash Kelvinator Corporation, Kenosha, Wisconsin.
 Knoff, H. C., Public Lighting Commission, Detroit, Michigan.
 La France, P., North Plant, Michigan Alkali Company, Wyandotte, Michigan.
 Lynn, R. G., American Hoist and Derrick Company, St. Paul, Minn.
 Phelan, J., Indiana and Michigan Electric Company, South Bend, Indiana.
 Road, R. A., Duncan Electric Manufacturing Company, Lafayette, Indiana.
 Schofield, L. B., Commonwealth Edison Company, Chicago, Ill.
 Sherman, V. W. (Member), Chrysler Corporation, Highland Park, Michigan.

6. NORTH CENTRAL

Forsman, E. H., Continental Air Lines, Incorporated, Denver, Colorado.
 Shaffer, R. E., Montgomery Ward Company, Denver, Colorado.

7. SOUTH WEST

Crail, R., Wichita High School East, Wichita, Kansas.
 Lichtenfels, I. W., General Electric Company, St. Louis, Mo.

8. PACIFIC

BRIDGWATER, M. M., Arizona Power Corporation, Prescott, Arizona.
 Curry, N., 1615 E. First Street, Long Beach, California.
 Williams, M. D., General Electric Company, Oakland, California.

9. NORTH WEST

Corfield, R. J. (Member re-election), Utah Copper Company, Garfield, Utah.
 Hoffman, W. L. (Member re-election), Puget Sound Power and Light Company, Seattle, Washington.
 Guirkin, L. C., Bonneville Power Administration, Portland, Oregon.
 Schulz, G. R., 1233 N. W. 12th Avenue, Portland, Oregon.
 Searles, P. D., Oregon Institute of Technology, Portland, Oregon.
 Trippett, B. H., Big Lakes Box Company, Klamath Falls, Oregon.

10. CANADA

Jones, A. R. (Member), Canadian General Electric Company, Peterborough, Ont., Canada.
 McKie, W. M., Canadian General Electric Company, Limited, Peterborough, Ont., Canada.
 Rogers, C. L., Hydro Electric Power Commission, Toronto, Ont., Canada.

Total, United States and Canada, 101

Elsewhere

Dessart, J. E., Tongshan Mine, c/o The Kailan Mining Administration, Tongshan, North China.
 Gerstmann, B., Bayley and Grimster, Carlton, Melbourne N3, Australia.
 Pfeifer, H. P. (Member), Nottebohm Trading Company, Apartado 193, San Salvador, El Salvador, C. A.
 Stokvis, L. G. (Member), Compagnie generale d'Electricite, 54 Rue de la Boetie, Paris, France.
 Woodward, A. G. V., New Zealand Military Forces, Trentham, New Zealand.
 Total, elsewhere, 5.

Recent Section Meetings

Section	Date	Speaker	Topic and Activity	Attendance
Akron	4/ 8/41	W. E. Haskell, N. Y. Herald Tribune	War News and Censorship; motion pictures	103
Central Indiana	4/25/41	N. C. Pearcy, Pub. Utilities Engg. & Serv. Co.	Electricity in the Steel Industry; motion pictures	75
Chicago	2/ 6/41	D. C. Prince, G.E. Co.	Trends in Engineering	150
		R. W. Sorensen, pres., AIEE	Talk	
		H. H. Henline, nat. sec., AIEE	Talk	
	2/13/41	H. M. Richardson, G.E. Co.	Plastics, Particularly for Insulating; power group meeting	103
	2/27/41	T. O. Millard, G.E. Co.; E. J. Novak, cons. engr.; J. F. Calvert, Northwestern Tech. Inst.	Low Voltage Network Distribution Systems for Industrial Plants and Buildings; industrial group meeting	116
	3/13/41	L. R. Potadle, A.T.&T. Co.	Stevens Point-Minneapolis Cable; joint with Western Soc. of Engrs.	217
	4/ 3/41	I. T. Faucett, General Cable Corp.	Wire and Cable Developments; election of officers; joint with WSE	113
	4/10/41	Major C. W. Leihy	Aspects of the National Power Pool, Defensively and Afterwards; luncheon meeting	130
	4/24/41	R. M. Schaffer, F. E. Andrews, Hatch, A. F. Highbeler, and Mr. Sagendorf	Round table discussion of distribution problems	90
Cleveland	4/17/41	F. R. Mautz, Western Reserve Univ.	Applications of Electricity to Medicine	82
		J. D. Andrew, student	The Right Angular Hyperbolic Spiral—A Criterion for Art	
		P. R. Kendall, student	Special Applications of Radio Equipment	
			Joint with Case School Branch	
Columbus	2/12/41	E. G. Romeiser, Illinois Elec. Porcelain Co.	Porcelain for Insulators; joint with Ohio State Univ. Branch	25
	2/18/41	Homer Dudley, Bell Tel. Labs.	The Vocoder, or Remaking Speech Electrically	65
	3/13/41	W. R. Gilsdorf, Spaulding Fibre Co.	Manufacture of Laminated Phenolic Sheets, Rods, and Tubes	17
	3/26/41	F. M. McKay, Columbus & So. Ohio Elec. Co.	Fundamentals of Rate Making; joint with Ohio Univ. Branch	46
	4/10/41	E. R. Raper, Springfield City Hospital Plant	Equipment of the Springfield Hospital	24
Connecticut	4/22/41	F. Cowan, A.T.&T. Co.	Sun Spots and Telephone Service; joint with New Haven Astron. Soc.	92
Denver	4/18/41	J. M. Cage, Univ. of Colorado	Problems in Vacuum Tube Development	130
		R. W. Sorensen, pres. AIEE	Brief talk	
		A. L. Turner, vice-pres., North Cent. Dist.	Brief talk	
East Tennessee	4/15/41	J. E. Housley, Aluminum Co. of America	Power Dispatching at the Alcoa Aluminum Reduction Works; dinner	65
Fort Wayne	2/18/41	C. M. Summers, G.E. Co.	High Potential Testing Equipment for Quantity Production	30
		F. J. Baker, Home Tel. & Tel. Co.	Trends in Communication Systems	
	3/13/41	W. L. Everitt, Ohio State Univ.	Fundamental Principles of Frequency Modulation	160
	4/21/41	R. W. Sorensen, pres. AIEE	Engineering Horizons, Limited	80
Houston	4/ 9/41	L. K. Davis and B. W. Pike, students	Localized Annealing of Rock Bit Bodies	68
		J. B. Parchman, student	A Privacy System Using Frequency Translation	
		R. S. Hoff, student	A High-Impedance Vacuum-Tube Wattmeter	
		O. M. Martin, student	Mathematical Analysis of Nonlinear Circuits	
			Joint with Rice Inst. and Texas A&M. Branches	
Louisville	4/25/41	F. R. Ellwanger, student	Testing of transformers using the cathode-ray oscilloscope; joint with Univ. of Louisville Branch	40
Lynn	10/22/40	B. Adams	A Program of Super-Magic	1,000
	11/12/40	Commander L. C. Stevens, U.S.N.	Development in Naval and Aircraft Equipment Shown by the War	900
	12/10/40	Major D. Sears, Universal newsreel cameraman	Get That Picture	900
	12/17/40	F. B. Silsbee	Electrical Work of the National Bureau of Standards	400
	1/ 7/41		The Story of the Coast Guard; motion pictures	600
	1/28/41	Ruth Bryan Owen	This Business of Diplomacy	1,000
	2/11/41		Illumination	1,000
	3/11/41		Safety Around Electrical Machinery	500
	3/25/41	Capt. J. Craig	The Philippines Today	1,000
Madison	4/17/41	H. L. Rusch, A. C. Nielsen Co.	Measuring Listening Habits of the American Radio Audience	39
Maryland	4/21/41	K. J. Affanasiiev	Prize paper contest	74
		H. J. Shafer	Properties of Magnetic Materials (first prize)	
		J. A. Harber	Development of Magnetic Theory (second prize)	
		Allen Pettee, General Cable Corp.	A Voltage Regulator for Synchronous Machines (third prize)	
Memphis	4/15/41	L. A. Hawkins, G.E. Co.	Recent Development in Wire & Cable Construction	22
Michigan	4/15/41	W. E. Weden, student	Research in World War; election of officers	175
Minnesota	4/22/41	K. Carlson and John Storm, students	Glass-Fiber Insulation	60
		M. Haugen, student	Oscillations Due to Loudspeaker-Microphone Feedback	
		T. Hedman, student	Black Light	
	4/28/41	J. W. Butler, G.E. Co.	Joint with Univ. of Minn. Branch	
Nebraska	12/ 4/40	E. E. Chilberg, Cent. Nebr. Pub. Power & Irrigation Dist.	Application of Series Capacitors in All Types of Circuits	44
			Mechanical and Electrical Design of the Transmission Lines	16
N. Mex.-W. Texas	4/ 2/41	R. W. Sorensen, pres. AIEE	Engineering Horizons, Limited; election of officers	53
New Orleans	3/28/41	P. G. Whitmore, Ebasco Services, Inc.	Electric Distribution Practices	101
Niagara Frontier	4/17/41	H. M. Cushing, Buff., Niag. & East. Power Corp.	Oswego Steam Station	58
North Texas	4/21/41	Major E. W. Porter, Air Corps	The Use of Electricity in Modern Airplanes	84
Philadelphia		H. N. Ekwall, Phila. Elec. Co.	Minimum Insulation Level for Lightning Protection of Medium-Voltage Lines	72
		E. W. Boehne, G.E. Co.	Traveling Waves on Very Short Lines	
Pittsburgh	4/ 8/41	C. S. Barrett, Carnegie Inst. of Tech.	X-Rays in Industry; election of officers; joint with elec. sec. ESWP	170
	4/22/41	G. B. Dodds and W. E. Marter, Duquesne Light Co.	Protective Relays for Power Systems and Elec. Equipment; joint meeting with elec. sec. of ESWP	126
Pittsfield	11/ 5/40	Carl Robinson	Southeastern Alaska; dinner	975
	11/26/40	K. K. Paluev, G.E. Co.	Creative Imagination, How to Train and Use It; colloquium series	75
	12/ 3/41	J. T. Flynn, writer	The Influence of the Election and the War on Business; dinner	1,010
	12/10/40	M. F. Beavers	Presentation of paper, "Effect of Load Factor on Operation of Power Transformers by Temperature," by V. M. Montsinger	20
		T. E. Palmer	Presentation of paper, "Lightning Currents in Arresters at Stations," by I. W. Gross and W. A. McMorris; colloquium series	
	1/ 7/41	Richard W. Rowan	Secret Agents Against America	1,025
	1/14/41	S. M. Humphrey, Taylor-Winfield Corp.	New Developments in Resistance Welding	58
	2/ 4/41	R. D. Evans, MIT	How Atoms Affect Your Life	960
	2/11/41	P. H. Light, G.E. Co.	Dynamic Overvoltages on Power Systems	15
	3/ 4/41	Howard Higgins	Among the Spirits	1,000
	3/25/41		Four papers presented in competition with four from Schenectady Section; competition won by Pittsfield	175
Portland	4/ 6/41	Fulton Lewis, Jr., commentator	What's Happening in Washington	1,050
	12/10/40	H. P. Beckendorf, Pacific Tel. & Tel. Co.	Community Dial Telephone Exchanges	45
	1/30/41	A. Bailey, A.T.&T. Co.	Coastal Harbor Radio Stations of the Bell System; joint with IRE	95
	3/31/41	W. C. Smith, G.E. Co.	Transformer design and operation	40
	4/16/41		Annual prize papers meeting	70

Recent Section Meetings (continued)

Section	Date	Speaker	Topic and Activity	Attendance
		H. E. Bixby and G. H. Bliesener	Use of Electrical Energy to Heat Rural and Urban Dwellings	
		C. B. Carpenter and U. H. Messenger	A Rectifier With Constant Current Output	
		W. E. Enns	A-C Network Analysis Using Resistance Networks (first prize)	
		O. W. Hurd	Automatic Tie-Line Load Control	
		R. E. McCoy	Division of Load Among a Group of Generators (second prize)	
	4/22/41	R. J. Collins, Pacific Tel. & Tel. Co.	Forecasting	29
Rochester	10/10/40	F. H. Roby, Square D Co.	Precision Timing as Applied to Welding and Industrial Control	78
	10/24/40		Fall party	85
	11/ 7/40	B. O'Brian, Univ. of Rochester	Measurement of Sun's Variability by Telemetering Balloons	60
	11/26/40		Round table discussion of radio progress in 1940	35
	12/ 5/40	C. A. Clark, International Tel. Devel. Corp.	IT&T Selenium Rectifiers	55
	1/ 9/41	G. V. Kullgren, G.E. Co.	Application Engineering Problems	92
	1/16/41		Annual bowling party	45
	2/ 6/41	C. Tuttle, Eastman Kodak Co.	Applications of Photoelectric Photometry in Industry	110
	2/19/41		Round table discussion of new requirements of the Nat. Elec. Code	50
	3/ 6/41	F. S. Goucher, Bell Tel. Labs. Inc.	The Microphone and Research	276
	4/ 3/41	E. M. Bouton, Westinghouse Elec. Elevator Co.	Vertical Transportation	56
St. Louis	4/16/41	A. L. Hughes, Washington Univ.	The Cyclotron	61
San Francisco	3/28/41	H. E. Becker, W.E.&M. Co.	Design, Construction, Application, and Operation of Ignitrons	110
	4/11/41	F. S. Benson, Pacific Gas & Elec. Co.	Electrical Features of Avon Steam Plant; dinner	70
	4/25/41	J. G. Stephenson, student	Hot-Cathode Oscillograph for Recording High Impulse Voltages	80
		W. R. Morton, student	Control of a Shunt Motor by Use of Permatrons	
		J. R. Burch, student	Electric Fencing	
Saskatchewan	2/13/41		Joint with Univ. of Santa Clara and Stanford Univ. Branches	
	3/ 7/41		Election of officers	5
	4/ 7/41		Executive committee meeting	4
Seattle	3/25/41	A. D. Moir, Bunker Hill Smelter Staff	Executive committee meeting	6
	4/14/41	D. Gjesdahl, student	17 Years Engineering in Europe; joint of four founder societies	170
		H. J. Winsor, student	Radiant Heating Application to Homes	56
			Survey of Naval Marine Propulsion	
Sharon	4/11/41	A. L. Draper, Buhl Planetarium	Joint meeting with Univ. of Wash. Branch	
South Bend	4/29/41	T. W. Dugdale, Ind. & Mich. Elec. Co.	The Pageant of Easter	125
Spokane	4/11/41	A. LeRoy Taylor, vice-pres., North West Dist.	Carrier Current Relays and High-Speed Reclosing Breakers	52
Syracuse	4/17/41	Wm. Bailey, Cornell-Dubilier Elec. Corp.	Engineering Education	27
Toledo	4/22/41	R. W. Sorensen, pres., AIEE	Application of Capacitors to Industrial and Power Circuits	115
Toronto	4/ 4/41	V. G. Smith, Univ. of Toronto	Engineering Horizons, Limited; dinner	50
	4/18/41	C. A. Powel, W.E.&M. Co.	The Use of Matrices in Communication; illustrated	84
	4/25/41	J. Satterly, Univ. of Toronto	Electricity in the National Defense	275
Washington	4/ 8/41	E. D. Merrill, Capital Transit Co.	Liquid Air, illustrated; election of officers	199
		C. A. Robinson, Chesa. & Potomac Tel. Co.	Financing Urban Transit	100
		M. L. Sperry, Washington Gas Light Co.	Some Problems of Management Under Present Day Conditions	
		A. G. Neal, Potomac Elec. Pwr. Co.	Washington Gas Light Company and National Defense	
			Operation Under the Washington Sliding Scale Arrangement	
	4/19/41		Meeting in honor of 34 past chairmen	
	4/22/41	H. H. Henline, nat. sec., AIEE	Inspection trip through Bethlehem Steel Co.	120
			Is the Institute Fulfilling Its Obligations to the Engineer; junior technical session	28
	4/24/41	T. J. MacKavanagh, Catholic Univ.	Is the Institute Fulfilling Its Obligations to the Engineer; junior technical session	20
	4/29/41	F. M. Defandorf, National Bureau of Standards	Is the Institute Fulfilling Its Obligations to the Engineer; junior technical session	15
West Virginia	4/16/41	W. E. Vellines, Jr., C.&P. Tel. Co.	Improved Instrumentalities in Intercity Telephone Plant Design	32
Worcester	4/25/41	R. W. Sorensen, pres., AIEE	Engineering Horizons, Limited; dinner	35

Recent Branch Meetings

Branch	Date	Speaker	Topic and Activity	Attendance
Arizona, Univ. of	11/26/40	D. Carter, student	Differential Equations	9
	12/ 3/40	J. C. Clark, counselor	The Importance of Temperamental Characteristics	9
	12/10/40		Business meeting	8
	12/17/40		Open house	32
	1/ 7/41	J. C. Clark, counselor	Getting a Job	32
	1/14/41	J. C. Clark, counselor	Getting a Job (concluded)	9
	2/ 4/41	R. Bookman, student	A Practical Problem in Communication	7
	2/11/41	R. Bookman, student	A Practical Problem in Communication (concluded)	6
	3/ 4/41	G. Floyd, student	Mercury Arc Rectifiers	6
	3/11/41	S. Goldman, student	The Characteristics of Transformer Insulating Materials	6
	3/25/41		Business meeting	6
	4/ 1/41	G. Floyd, student	Station Circuits	5
Arkansas, Univ. of	4/16/41	R. Bookman, student	Prime Movers	
		W. Dorch, student	Mercury Arc Rectifiers	20
		L. Shackelford, student	Application of Seismographs	
			Corona Causes and Prevention	
	4/23/41		Election of officers	
Brooklyn Poly. Inst. (D.)	3/ 4/41	A. Anderson, Underwriters Labs.	The National Electrical Safety Code	15
	3/11/41	S. Frangoulis, student	The History of Television	35
	3/21/41		Inspection trip through Underwriters Labs.	35
	4/ 1/41	A. Dolan, student	The Design and Construction of a Vacuum-Tube Voltmeter	40
	4/ 9/41	P. Thomas, W.E.&M. Co.	Demonstration	300
	4/24/41		Annual convention at Rutgers Univ., New Brunswick, N. J.	45
Brooklyn, Poly. Inst. (E.)	3/17/41	Mr. Krowl, N.Y.C. Tunnel Authority	Design and layout of the lighting and signal equipment in the Queens-Midtown Tunnel	25
	4/21/41	Robin Beach	Experiences in connection with several court cases	16
Calif. Inst. of Tech.	3/ 7/41		Inspection trip through Paramount sound studios	42
	3/14/41		Inspection trip through Columbia recording studios	10
	4/ 2/41		Inspection trip to the Southern Calif. Edison Co. test dept.	35

Recent Branch Meetings (continued)

Branch	Date	Speaker	Topic and Activity	Attendance
	4/ 7/41...	C. B. Stadium, student R. E. Kingsmill, student	The Behavior of Insulators in Hydrogen The Shielding Effects of Transmission Lines	
Calif., Univ. of	4/ 4/41		Joint with Los Angeles Section, and Univ. of So. Calif. Branch	10
	4/14/41		Inspection trip through Alameda cross-bar exchange	10
	4/14/41	J. Stephenson, student R. C. Balsley, student J. Burch, student	Executive committee meeting Trip through the cross-bar telephone exchange Low Voltage Short-Circuits on Distribution Systems	34
Carnegie Inst. of Tech.	9/27/40...	G. W. Murdock, student	Electric Fencing	
	10/ 4/40...	J. Jenkins, student	Carbon	50
	10/11/40...	J. Darnall, student	Electronic Musical Instruments	50
	10/18/40...	G. Klotzbaugh, student	Rural Electrifications	50
	10/25/40...	G. Wheeler, student	Transient Phenomena	50
	11/ 1/40...	Wm. Preece, student	Unit Power Plants	50
	11/ 8/40...	G. B. Wilson, student	Aeronautical Instruments	50
	11/14/40...	W. A. Needs, student	Plastics and Their Application in the Electrical Industry	50
	11/22/40...	R. W. Gilliland, student	Electric Furnaces in Steel Production	50
	12/ 6/40...	M. L. Levy, student	The Ionosphere	50
	12/13/40...	R. Herpick, student	Gem Cutting	50
	1/10/41...	A. Helfer, student	The Story of the Akron	50
	2/ 7/41...	L. Drugmong and G. McElwee, students	Phonograph Recording	50
	2/14/41...	H. Cooper, student	Frequency Modulation	50
	2/21/41...	C. T. Sinclair, vice-pres., Dist. 2	Battleship Power Plants	50
	2/28/41...	C. A. Powell, W.E.&M. Co.	Advice to the Embryo Engineer	50
	3/ 7/41...	C. M. Martsoff, Bell Tel. Co.	Application Engineering	50
	3/14/41...	R. L. Kirk, Duquesne Light Co.	System Planning Engineering	50
	3/21/41...	S. Balaban, student	How, Where, and What (Engineering Counsel)	50
	3/28/41...	T. B. Whitson, J. J. Biddle Co.	The Incandescent Light	50
	4/ 4/41...	G. T. Fouse, student	Megger Practice	50
	4/18/41...	F. C. Hesch, student	Fourth Dimension	50
	4/25/41...	R. DeStefano, student	The Electron Microscope	50
Clarkson Col.	4/23/41...	A. R. Powers, counselor	Fluorescent Lighting	50
Colorado State Col.	4/11/41...	H. Nuce, student D. Hendrix, student	Advantages of the AIEE	15
Colorado, Univ. of	4/ 9/41...	W. C. Brown and R. H. West, students	Electrical Accidents	16
Columbia University	4/ 7/41...		MKS System of Units; election of officers	
	4/24/41...		The Amplidyne as a Voltage Regulator; election of officers	35
Conn., Univ. of	5/ 5/41...		Business meeting	15
	2/20/41...	E. S. Lee, vice-pres., North East. Dist.	Business meeting	15
	2/28/41...	H. P. Stone, student	Business meeting	15
	3/21/41...	J. H. Lampe, dean of engg.	Business meeting	15
Cooper Union (E.)	4/11/41...	B. Shmulevitz, student	The Prominence of Measurements in Industry; inaugural meeting	159
Cornell Univ.	4/16/41...	E. T. B. Gross	De-Ion Circuit Breakers	22
Detroit, Univ. of	1/14/41...	T. S. Cawthorne, Weston Elec. Inst. Co.	Talk on experiences with power companies; election of officers	24
	2/26/41...		A Survey of Frequency Modulation	25
Drexel Inst. of Tech.	3/12/41...	Wm. Dean, senior	Euclid Applied to Circle Diagrams	38
Duke Univ.	4/ 9/41...	T. P. Moody, N. Y. Shipbuilding Co.	Design Details of Electrical Instruments	54
	10/ 1/40...	W. J. Seeley	Social meeting	63
	10/15/40...	G. Bennett, Durham Public Service Co.	Fundamentals of Radio Broadcasting; motion pictures	58
	11/ 5/40...	C. R. Vail, Duke Univ.	Problems of Modern Transit Ship Design	55
	11/19/40...	O. Meier, Jr., counselor	AIEE activities	22
	12/10/40...	T. S. Shinn, Carolina Power & Light Co.	Situations met by a public service engineer	21
	1/ 7/41...		Engineering Experiences at the World's Fair	19
	1/28/41...	Members of the Durham Fire Dept.	Demonstration of fluorescent lighting circuits	25
	2/28/41...		Engineering Safety	21
George Washington Univ.	3/ 4/41...	H. Hart, Duke Univ.	Talks on various subjects by faculty members	20
	9/25/40...	F. Hermach, student	Demonstrations on safety precautions and first aid treatment	28
	10/ 2/40...		Discussion of engineers' show	25
	11/ 6/40...	H. H. Rogge, W.E.&M. Co.	Happiness	28
	12/ 4/40...	D. C. Coyle, consulting engr.	Electrical Units and Standards	26
Georgia Sch. of Tech.	4/18/41...	K. Weisiger, Southern Bell Tel. & Tel. Co.	Semiannual engineers' mixer	155
Harvard Univ.	2/20/41...	J. P. Newton, student F. W. White, Jr., student	The Electrical Engineer as a Salesman	39
	3/13/41...	C. L. Dawes, Harvard Univ.	Engineering Economics of Capitalism	73
Illinois Inst. of Tech.	3/27/41...	Robert Zane, Okonite Corp.	The Engineer's Place in National Defense	53
	4/ 4/41...		Analysis of the Capacitor Motor	27
Illinois, Univ. of	4/18/41...	H. L. Oleson, Weston Electric Inst. Co.	Spark Discharge in Air at Atmospheric Pressure	
	2/26/41...	E. S. Lee, G.E. Co.	Alexanderson Thyratron Motor	30
Iowa State Col.	4/23/41...		Motion pictures	20
Iowa, Univ. of	4/16/41...		Discussion of wires and cables; motion picture on Okonite products	45
	4/30/41...	E. L. Goss, student F. C. Vernon, student	Election of officers	40
		B. Hills, student	Annual smoker	85
Johns Hopkins Univ.	2/ 7/41...	R. Weller, student	Meet a Meter	75
		C. Bechtel, student	The Prominence of Measurements in Industry	90
	2/21/41...	I. C. Tillman, student	General discussion	29
		R. Bell, student	Motion pictures	40
	3/ 7/41...	R. D. Case, student	Ultrasomics	33
		E. Melvin, student	Construction of Commutators	
	3/21/41...	W. L. Wilkerson, student	Polyphase Currents in Squirrel Cage Motors	
	4/ 3/41...	E. Eager, student	Relays and Their Operations	18
Kansas, Univ. of	4/11/41...		Velocity Modulation of Electron Discharge	16
	3/25/41...	J. L. Hamilton, vice-pres., South West Dist.	Geiger Counters	
	4/ 3/41...	R. York, student	Expulsion Gap Protection	16
		J. Laidig, student	Test Equipment for Transformers	
Kentucky, Univ. of	4/11/41...		Ultrahigh-Frequency Propagation	17
	4/25/41...		Electric Locomotives	28
Lehigh Univ.	12/19/40...		Conowingo Dam	32
	3/20/41...	W. H. Vogelsberg, student	Election of officers	40
	4/17/41...	W. H. Formhals, W.E.&M. Co.	Engineering—Past, Present, and Future	20
			Feedback	40
			Commutation Currents	
			Discussion of recent inspection trip	50
			Election of officers	30
			Dinner	71
			The Hammond Electric Organ	42
			Electrical Equipment for Modern Machine Tools	45

Recent Branch Meetings (continued)

Branch	Date	Speaker	Topic and Activity	Attendance
Maine, Univ. of.....	4/10/41	David Byer, student..... Mr. Brown, student..... C. Preble, student.....	Trip to Ford River Rouge Plant and W.E.&M. Co..... Research laboratory at M.I.T..... Experiences in summer employment.....	8
	4/22/41		Election of Branch chairman.....	16
	4/28/41	R. W. Sorenson, pres., AIEE	Engineering Horizons, Limited.....	222
Mich. Col. of M.&T.....	4/15/41		Social meeting.....	40
Michigan State Col.....	4/9/41	Mr. Wills, U. S. Weather Bureau	The Weather.....	26
Michigan, Univ. of.....	4/22/41	C. E. Fishbeck, Detroit Edison Co.	System Operation.....	32
Minnesota, Univ. of.....	3/5/41	O. S. Duffendak, Univ. of Mich.	The Electron Microscope.....	43
Missouri Sch. of M.&M.....	3/19/41	B. Sexton, student..... M. Block, student..... L. Kueker, student.....	Engineering and Living Conditions in China; motion pictures..... G.E. developments of the past year..... Nomographs for Electrical Calculations Electron Microscope.....	32
Missouri, Univ. of.....	4/1/41		Motion pictures.....	17
	10/29/40	G. Green, student..... P. Smith, student.....	Fluorescent Lighting..... Lighting, the Incandescent Lamp.....	52
	2/18/41	L. A. Nickell, Columbia Ice Co.	Setting Up of Small Power Plants; Operation of an Ice Plant.....	36
	4/1/41		Discussion of future activities.....	23
Montana State Col.....	4/8/41	Mr. Williams, Montana Power Co.	Watt-Hour Meters.....	25
Nebraska, Univ. of.....	4/16/41	Mr. Pappas, student.....	The New KFOR Transmitter.....	39
Nevada, Univ. of.....	2/25/41	L. N. Roberts, Pacific Tel. & Tel. Co.	New Requirements in Industrial Leadership.....	19
	3/4/41		Preparations for Engineers' Day.....	28
	4/22/41	R. L. Shipp, student.....	The Hysteresograph.....	17
	4/29/41	L. L. Stoffel, Ohio Carbon Co.	Carbon Manufacturing; election of officers.....	19
New Hampshire, Univ. of.....	4/24/41		Election of officers.....	19
New Mexico State Col.....	4/17/41		Election of officers.....	11
New Mexico, Univ. of.....	4/17/41		Election of officers.....	14
New York Univ. (E.).....	4/2/41	I. Ritter, N.Y.U.	Exterior Ballistics.....	23
	4/30/41		Business meeting.....	17
N. C. State Col.....	4/1/41		Discussion of plans for Engineers' Fair.....	59
	4/15/41	W. H. Blue, student.....	Description of the District conf. on student activities.....	37
	4/22/41		Election of officers.....	46
N. Dak. State Col.....	4/3/41		Discussion of future papers.....	15
	4/8/41		Discussion of papers to be presented at student convention; election of officers.....	16
N. Dak., Univ. of.....	4/8/41	R. E. Smith and K. Smith, students..... F. Olson and H. Hanson, students.....	Ultraviolet Rays..... The Coloratron.....	16
	4/23/41		General discussion.....	14
Ohio State Univ.....	2/6/41	J. T. Newman, student.....	Electricity Up to the Time of Franklin.....	38
	2/12/41	E. G. Romeiser, Illinois Elec. Porcelain Co.	Porcelain the Paragon of Insulators.....	70
	2/20/41	J. Cumming, student.....	Duties of a Substation Crew Man.....	28
	3/3/41	F. O. Wisman, student.....	Synthetic Symmetry in Mutual Inductance Balance.....	29
	3/7-8/41		Inspection trips and technical sessions; joint with Univ. of Cincinnati and Ohio Northern Univ. Branches	39
Ohio Univ.....	10/23/40	P. Ford, student.....	Who Are the Engineers.....	12
	11/20/40		Business meeting.....	15
	3/5/41		Business meeting.....	17
	3/26/41	F. M. McKay, Southern Ohio Elec. Co.	Fundamentals of Rate Making; joint with Columbus Section.....	30
	4/30/41		Election of officers.....	10
Oklahoma, Univ. of.....	4/3/41	J. Stratton, student.....	Inverse Feedback of Rectified Radio Frequency; motion pictures	25
Oregon State Col.....	2/19/41	W. R. Volhey, Oregon Bureau of Labor.	Obligations of employers and workmen under Oregon Safety Code	28
	3/6/41	C. J. Hawkes, Electric Storage Battery Co.	Storage Batteries in Industry.....	56
	4/3/41	C. C. White, L. Chaffin, and J. N. Paszkowski, students.....		
Pennsylvania State Col.....	4/2-9/41		Symposium: Desirable Training for the Engineering Profession	28
	4/28/41	J. O. Perrine, A.T.&T. Co.	Inspection trip.....	57
Pennsylvania, Univ. of.....	4/28/41		The Artificial Creation of Speech.....	800
Pittsburgh, Univ. of.....	9/26/40	J. V. Heish, student.....	Annual student branch convention.....	185
	10/3/40		Types of oil deposits and use of instruments in development work	90
	10/10/40	H. H. Miller, student..... J. Dugan, student.....	Motion pictures.....	90
	10/17/40	H. A. Brant, student.....	The Signal Generator—Its Operation and Applications.....	89
	10/24/40	R. C. Gorham, counselor..... W. P. Smith, student.....	Marine Mines in Our Coastal Defense	89
	10/31/40		Current Diversion.....	89
	11/7/40	C. W. Drake, W.E.&M. Co.	Middle Eastern District meeting	89
	11/14/40	R. A. Kirkpatrick, Union Pacific Railroad	History of Eta Kappa Nu	90
	11/21/40	James Rial, student..... Dr. Farmer, university chaplain.....	Motion pictures.....	89
	11/21/40	F. N. Blum, student..... C. O. Beltz, student.....	Outline of various jobs.....	90
	12/12/40	L. A. Terven, West Penn Pwr. Co.	Boulder Dam.....	90
	1/9/41	E. A. Holbrook, dean of engg.	Function of the Engg. and Mines Committee of Y.M.C.A.....	88
	1/16/41	L. Barranti, student..... R. Parker, student.....	Value of Religion	88
	1/23/41	W. D. Brown, Duquesne Light Co.	Pennsylvania Electric Co.....	88
	2/13/41	J. Unitus, U. S. Secret Service	The Manufacture of an A-C Motor	88
	2/20/41	Mr. Compton, Duquesne Light Co.	Growth of Power Utilities.....	89
	2/27/41	S. Kovacevic, student..... J. Quinn, student.....	National Defense Program.....	89
	3/6/41	D. I. Baun, Aluminum Co. of America.	Fluorescent Lighting.....	90
	3/13/41		Hydrogen Cooled Generators	90
	3/20/41	W. G. Crouch, Prof.	Primary System of Duquesne Light and Its Interconnections	90
	3/27/41	J. Barclay Whitson, J. G. Biddle Co.	Know Your Money.....	89
	4/3/41	D. Ornitz and A. Lasday, students.....	Relay Protective Devices.....	89
	4/17/41	R. Powell, student.....	High Speed Photography.....	90
	4/24/41	John McWade, student.....	Electrical Precipitation Applied to Cleaning Gases	90
	4/29/41	W. Beagan, student..... H. Pinkham, student..... G. E. Gilmore, student.....	Aluminum Company of America's Power Holdings in the U. S..... Annual presentation of Eta Kappa Nu pledges.....	90
Pratt Inst.....	4/3/41		Why We Go to See a Tragedy.....	87
	3/27/41		The Megger Instrument.....	87
	4/3/41		The Mass Spectograph.....	89
	4/17/41	R. Powell, student.....	Concrete Research	89
	4/24/41	John McWade, student.....	Frequency Modulation.....	81
	4/29/41		Inspection trip through X-Ray Division of W.E.&M. Co.	7
Purdue Univ.....	4/18/41	P. Thomas, W.E.&M. Co.	Sperry Rail Testers.....	35
	4/16/41	H. P. St. Clair, American Gas & Elec. Corp.	Measurement of Light	91
			Electrical Power Requirements for National Defense	91
			Demonstration.....	50

Recent Branch Meetings (continued)

Branch	Date	Speaker	Topic and Activity	Attendance
Rice Inst.	3/ 13/41	J. L. Hamilton, vice-pres., South West Dist.	Advantages of AIEE membership; joint with Texas A.&M. Col. Branch	58
	4/ 9/41	L. K. Davis and B. W. Pike, students.	Localized Annealing of Rock Bit Bodies	68
		R. S. Hoff, student.	A High Impedance Vacuum Tube Wattmeter	
		J. Parchman, student.	A Privacy System Using Frequency Translation	
		O. M. Martin, student.	Mathematical Analysis of Nonlinear Circuits	
Rutgers Univ.	1/15/41	R. Kennedy, student.	Joint with Texas A.&M. Branch and Houston Section	
		S. Mason, student.	The Future of Engineering at Rutgers.	30
		M. Scherb, student.	The Mechanical Integrator and Planimeter	
	2/27/41	H. Johnson, Rutgers Univ.	Frequency Modulation	
Santa Clara, Univ. of	1/14/41	W. Morton, student.	Illustrated talk on trip to Greenland.	31
	1/28/41	J. Ganahl, student.	Processes involved in reducing timber to lumber	14
	2/26/41	Mr. Ryan, student.	Construction of the Prado Dam.	15
	3/11/41	J. Susoeff, student.	Safety in the Electrical Testing Laboratory.	21
		F. M. Howe, student.	Electricity in Medicine.	11
	3/28/41	J. Dorn, student.	Functions of the Line Crew of the P.G.&E. Co.	
	4/23/41	W. Morton, student.	Applications in Lighting.	10
S. Dak. State Col.	10/ 2/40		Speed Control of Shunt Motors; election of officers.	13
	10/16/40		Motion pictures.	22
	11/20/40		Demonstration on fluorescent lighting.	25
	12/ 4/40		Discussion on frequency modulation.	23
	1/ 8/41		Discussion on frequency modulation.	15
	2/ 5/41		Motion pictures.	25
	2/19/41		Demonstration of electrical method of transposing international code signals into a typewritten message	25
	3/ 5/41		Discussion on nomography.	15
	3/18/41		Election of officers.	25
	4/ 2/41		Business meeting.	7
	4/16/41	H. Johnson and K. Hammer, students.	Explanation of television methods.	27
	4/18-19/41	R. Barthle and V. Winters, students.	Papers.	12
	4/30/41		Amateur Television.	8
S. Dak. State Sch. of Mines	4/ 3/41		Discussion.	12
So. Calif., Univ. of	3/27/41	Mr. Kingsmill, student.	Discussion of future plans; election of Branch chairman.	12
	4/ 8/41	Messrs. Dawson and Stadium, students.	Inspection trip through RCA recording studios.	20
		L. Wilson, student.	The Shielding Effect of Towers on Transmission Line Conductors	120
		Mr. Romero, student.	The Behavior of Insulators in Hydrogen	
		R. Hedges, student.	Power Factor Measurements by Vacuum Tube Voltmeter	
			New Frontiers in Southern Calif.	
Stanford Univ.	4/15/41	W. Cline, Don Lee Television Sta. WcXAO.	An Electrical Method for Automatic Musical Transposition	25
	4/16/41	R. V. Howard, Radio Station KSFO.	Joint with Los Angeles Section and Calif. Inst. of Tech. Branch	65
	4/26/41		Problems met with in building and operating a television station	
Swarthmore Col.	3/13/41		Theoretical and Practical Aspects of Wave Propagation as Applied to Radio Broadcasting; election of officers	
	4/15/41	M. I. Allen, Philadelphia Elec. Co.	Inspection trip through the P.G.&E. Co.	8
Tennessee, Univ. of	1/22/41		Election of officers.	7
	2/13/41		Some Aspects of Utility Power Service.	26
Texas A.&M. Col.	3/13/41		Motion pictures.	16
	3/27/41		Motion pictures.	50
	4/17/41		Discussion.	21
Texas Tech. Col.	4/21/41	W. D. Price, Texas-New Mexico Utilities Co.	Motion pictures.	43
Texas, Univ. of	3/31/41	Mr. Morehouse, Leeds & Northrup Corp.	Election of chairman.	23
	4/15/41		Automatic Control; election of officers.	22
Tufts Col.	4/17/41		Control of Load Frequency on Interconnected Power Systems.	38
Tulane Univ.	3/ 7/41	B. Lavitola, student.	Election of officers.	19
	4/10/41		Placing the Decimal Point in Slide Rule Computations; election of officers.	29
	4/18/41	Messrs. Basnett and DeLerno, students.	Motion pictures.	22
		Messrs. Haley, Herrod, and Lockwood, students	An Electronic Circuit for Determining Power Angle Oscillations	15
			Remote Control by Radio	39
Union College	4/29/41	Fred Fisch, Bureau of Traffic and City Planning	Joint with New Orleans Section	
			Traffic Control Equipment; election of officers.	50
Utah, Univ. of	2/14/41	R. W. Sorenson, pres., AIEE.	Engineering Horizons, Limited.	50
	3/12/41	E. Backman.	Development of electrical apparatus in the mining industry.	38
	3/24/41		Discussion of plans for Engineering Week exhibits.	25
Vermont, Univ. of	4/24/41		Election of officers.	31
	1/17/41	R. Marshall, student.	Research laboratory of the Sprague Specialties Co.	12
	2/ 7/41	E. R. McKee, counselor.	Plans for Engineers' Day.	29
	3/ 7/41	H. B. Coburn, student.	ROTC summer training camp at Fort Devens.	14
	4/11/41		Motion pictures.	18
	4/18/41		Election of officers; motion pictures.	15
Virginia Poly. Inst.	4/25/41	B. P. Brown, student.	A New Television Antenna.	15
	4/10/41		Annual smoker.	71
	4/17/41		General discussion.	41
Virginia, Univ. of	9/24/40	L. A. Quarles, counselor.	AIEE activities.	25
	10/29/40		Discussion of future activities.	17
	11/16/40		Inspection trip to Va. Pub. Serv. Co.	14
	1/29/41	P. Peyton, student.	The Advantages of Frequency Modulation in Radio.	16
	2/19/41	C. Y. Johnson, student.	Instrument Landing for Aircraft by Radio.	14
Washington State Col.	4/17/41	Capt. Grafton, Military Dept.	Informal talk.	26
Washington, Univ. of	3/ 7/41	C. Terrell, Puget Sound Pwr. & Lt. Co.	Notes of an Engineer.	57
	4/25/41		Inspection tour of Bremerton Navy Yard.	59
Washington Univ.	4/ 7/41		A Resonant Type of Constant Current Regulator	
	4/21/41		Inspection trip through G.E. Lamp Works.	17
	4/21/41		Election of officers.	26
West Virginia Univ.	4/14/41		Motion pictures.	35
Wisconsin, Univ. of	4/17/41	H. Rusch, A. C. Nielsen Co.	Measuring Listening Habits of the American Radio Audience.	45
Wyoming, Univ. of	4/ 9/41	S. Phillips, student.	Airways Radio Ranges; election of officers.	13
	4/22/41		Discussion of future activities.	8
	4/28/41		Discussion of Engineers' Open House Display.	15